~~05.42~~ OCTOBER – DECEMBER 1985 (no 975) VOLUME 110

QH
1
N2853
NH

THE NATURALIST

A Quarterly Journal of Natural History for the North of England

Edited by M. R. D. SEAWARD, MSc, PhD, DSc, FLS, The University, Bradford

PAGE CONTENTS

125 Collectors and Collections — *Adrian Norris*
133 Parasites of British, Lake-Dwelling Leeches — *S. M. Spelling* and *J. O. Young*
141 The Amateur and Professional Scientist: A Comment on Louis C. Miall (1842–1921) — *R. A. Baker* and *R. A. Bayliss*
146 Field Notes
147 Pondweed Records — *W. A. Sledge*
148 Fungus Forays in 1984 — *T. F. Hering*
150 Botanical Report for 1984
158 Contributors
132, 140, 154–158 Book Reviews
159 Index

SMITHSONIAN
JAN 31 1986
LIBRARIES

PUBLISHED BY
THE YORKSHIRE NATURALISTS' UNION

The Lepidoptera of Yorkshire

Separates of the collected instalments which appeared serially in *The Naturalist* (1967–70) are available from Dr W. A. Sledge, Department of Plant Sciences, University of Leeds, Leeds 2. Price £1 plus 18p postage.

'The Naturalist' is available in microform

UNIVERSITY MICROFILMS INTERNATIONAL

300 North Zeeb Road
Dept PR
Ann Arbor, Mi 48106
USA

White Swan House
Godstone
Surrey RH9 8LW
England

BINDING

Why not have your copies of *The Naturalist* bound into volumes? One year's issues per volume, or alternatively two years in one volume at less cost than binding as two separate volumes. We are also experienced and expert in the re-binding and repairing of all books.

Spink & Thackray
Broomfield Bindery
Back Broomfield Crescent
LEEDS LS6 3BP Telephone 0532 780353

Notice to Contributors to 'The Naturalist'

Manuscripts (two copies if possible), typed double-spaced on one side of the paper only with margins at top and left-hand at least 2.5 cm wide, should be submitted. Latin names of genera and species, but nothing else, should be underlined. S.I. Units should be used wherever possible. Authors must ensure that their references are accurately cited, and that the titles of the journals are correctly abbreviated. Volumes of *The Naturalist* for the years 1886 to 1975 have been retrospectively numbered 11 to 100 to accord with numbering before and after this period (see YNU *Bulletin* no. 3, pp. 21–22, 1985); please cite these volume numbers in all references. Tables and text-figures should be prepared on separate sheets of paper. Drawings and graphs, drawn about twice the linear size they are to appear, should be in jet-black Indian ink, and legends should not be written on the figures.

Subscription rates: Issued free to individual members of the Yorkshire Naturalists' Union and to Affiliated Societies.

Institutions and Subscribers £10.00.

All subscriptions should be forwarded to:
Mr D. Bramley
c/o Doncaster Museum
Chequer Road
Doncaster DN1 2AE

COLLECTORS AND COLLECTIONS

ADRIAN NORRIS

Presidential Address to the Yorkshire Naturalists' Union, Hull, 1 December 1984

The collecting of natural objects is instinctive to every child, a relic of the time when the collecting of animals and plants for food was essential to survival. Hunter-gatherer societies in South America still carry on a way of life today which would have been familiar to our ancestors. The development of agricultural society took away the need to collect those species of animals and plants which could be grown or reared in settled farming communities. The settlement of nomadic societies however, resulting as it did in the clearance of natural forest, put a demand on the flora and fauna. These developments led to the formation of larger groups of people who had to learn new skills in order to protect themselves from, catch or find animals and plants which had previously proved too elusive because of the time and energy required to track them down. Additional skills were also acquired from man's ability to observe specific animals and plants in fixed localities over many years, the best known being the use of plants for herbal medicine. As a result, early herbalists produced the forerunners of today's familiar herbaria.

As communities become more highly organized, the collecting of animals and plants for food and medicines no longer took all the time available, and man was able to develop his aesthetic senses more fully. These developments took many forms, but most of them were based on natural curiosity about the animals, plants and objects encountered in the surrounding environment. As long ago as the Palaeolithic period objects began to be collected for their beauty, their curiosity value, or even (as in the case of some fossil ammonites) for their religious significance. Shells and other natural objects are known to have been worn as decorative ornaments in prehistoric times, and it is reasonable to assume that aggregations of related objects similar to what we would consider 'a collection' could have been in existence even then.

Later on, collections of natural objects were intended to stimulate the observer's curiosity into deep thought. The rich, the well educated, great philosophers, churchmen, and artists had the time to cultivate these instincts for the muses. Not surprisingly, therefore, it was these people who started to build the great collections of the past. The earliest 'museum' (from the Greek word 'museion'), encompassing all aspects of 'collecting' was built by Ptolemy Soter or Ptolemy Philadelphus the then ruler of Alexandria in 280 BC. This 'museum' had little to do with our modern understanding of the word, but it did contain collections of both dead and live animals and plants as well as rooms for the study of anatomy and the sciences (Bazin 1967).

Germaine Bazin (1967) describes how, in Renaissance times, Cosimo I formed a cabinet devoted to natural history containing actual animals, shells, fossils and minerals as well as casts made from nature by Della Robbia and Riccio as part of the Medici family collections. This cabinet of curiosities also included botanical and zoological drawings by Francesco d'Umbertino, il Bacchiacca. The Medici Archdukes also helped the Bolognese naturalist Ulisse Aldrovandi in the compilation of his *Natural History* by commissioning illustrators. Although their poverty of talent grieved Aldrovandi, some 8,500 drawings of animals, plants, minerals and gems were produced, some of specimens from as far away as the 'Indies'.

The 'Cabinet of Curiosities' became all the rage in the courts of Europe throughout the 15th and 16th centuries. Some of these cabinets, for example, those of the great Dutch collectors Desiderius Erasmus (1467–1536) and Bernardus Paludanus (1550–1633), are as well known to museum historians today as they must have been in their heyday to the European aristocracy.

In Britain, John Tradescant (*d* 1637) is considered to be the first person to have publicly displayed a collection of natural curiosities. He and his son John the Younger (1608–1662)

built up a large collection of natural history objects in the course of their travels to Russia, America and many other parts of the world. A sumptuous catalogue of the collection was published by John the Younger in 1656 under the title *Musaeum Tradescantianum*. The Tradescant museum and botanical garden was situated in South Lambeth in London where it became known locally as the 'Ark of Lambeth' (Wittlin 1949) or 'Tradescant Ark'. The collection was bequeathed by John the Younger to Elias Ashmole who presented the whole collection to Oxford University on condition that they would provide suitable accommodation (Mills 1973). The University erected a new building to house the collections between 1679 and 1683, and the 'Ashmolean Museum' thus became the first of our true public museums. The size of the collection can be estimated in that it consisted of 'twelve cartloads of curiosities' when it was received by Ashmole from John Tradescant. A telling note can be found in Ashmole's diary where he wrote on 17th February 1683, 'The last load of my rarities was sent to the barge, and this afternoon I relapsed into gout'.

Yorkshire had its share of early collectors with people like Dr Martin Lister (1639–1712) and Ralph Thoresby (1658–1725) leading the way. In his book *Ducatus Leodiensis* published in 1715, Thoresby gives a detailed account of the contents of his collection. A study of these early catalogues shows that these early museums were very different from those of today, exhibiting items which would, at the very least, be considered in bad taste if exhibited at the present time. The following is just a selection of the many such items exhibited in Thoresby's museum: 'Paper stained to a perfect Claret colour, by the urine of Capt. Croft of Leeds', 'A pugill of the dust (unmixed with earth) of a noble Countess, not easily distinguished from common dust and ashes', 'the hand and arm cut off at the elbow, positively asserted to be that of the celebrated Marquis of Montrose . . . and seems really to have been the very hand that wrote the famous epitaph (Great, Good and Just) for King Charles the 1st', and 'The Pizzle of a Hippopotamus (the Behemoth mentioned in Job) twenty inches long, the Glans being now dryed, but seven inches round'. The Museum Thoresbyensis could be considered to be the first of many museums to be established in Yorkshire.

By the early 19th century a number of private museums had become, or were being established, some in stately homes, as at Burton Constable House near Hull, and others in smaller private houses. John Calvert of Leeds even had a purpose-built building erected to show off his museum. The Calvert museum of 10 Commercial Street, Leeds was opened to the public in 1827 with an entrance fee of one shilling. John Calvert even published a catalogue of his museum entitled 'A Companion to the Leeds Museum of Natural Curiosities, Antiquities, Works of Art &c. &c' in 1826, with a second edition in 1829. It shows the high quality of some of these private collections, as it even included such items as a 'Preserved Head of a New Zealand Chief of the first rank, remarkable on account of its tattowing'.

The foundation of the Literary and Philosophical Societies, at Leeds in 1818, Sheffield 1822, Bradford, Whitby and York 1823, Wakefield and Scarborough 1827 and Halifax in 1830 (Brears 1984), and the subsequent establishment of their permanent museums, reflected the growing interest in man and his environment largely as a result of world exploration and the establishment of a colonial empire. These museums encouraged the collecting of every type of man-made and natural object with an insatiable hunger for material from both local and exotic sources. By the mid-Victorian period, collecting had become a way of life for many people. Professional collectors supplied the needs of museums, zoos and the growing number of private collectors, each trying to outdo the other by possessing something new and exotic. The early records of these museums reflect this hunger for material, and the willingness of man to collect to excess. Most people can name at least some of the many animals and birds that have become extinct purely as a result of man's greed, fuelled by ignorance — the Dodo, Passenger Pigeon, Great Auk, Carolina Parakeet, Tasmanian Wolf, Tasmanian Devil and many others too numerous to mention.

The Leeds Museum is typical of the Literary and Philosophical Society Museums: it aimed to expand the knowledge of its members in 'all the Branches of Natural Knowledge

and Literature (strictly so called), but excluding all topics of Religion, Politics and Ethics' (Clark 1924). The quantity of material collected for and on behalf of Leeds Museum in the 19th century would be considered excessive by today's standards but is typical of museums and collectors of the period. The following letter from M. A. B. Gellibrand of Cleveland, Tasmania, dated 12th August 1869, is just one of several relating to the acquisition of overseas material by the Leeds Museum (Fig. 1):

> Dear Sir,
>
> I have at last packed up and sent away *one* cask containing the following animals Six Tigers 'three large males one female and two half grown pups one male and one female'. The mother of these I sent to Mr Allport and she is I believe at the Museum *Cambridge*, Two female devils, one beaver Rat, one Kangaroo Rat, one Black spotted Native cat one tiger cat, two tiger skins a lot of skulls and also a jar of spirits containing young wallaby one young wombat, and tied in a piece of rag two devils and four young Tigers all taken from the pouch and last but not least one Duck billed platypus . . .

The fifteen tigers mentioned in the letter are in fact specimens of the Tasmanian Wolf *(Thylacinus cynocephalus)*. In all, Mr Gellibrand and a Mr George Noble sold or gave the Leeds Museum a total of 20 specimens of the Tasmanian Wolf between 1860 and 1895.

The scientists, taxidermists, museums and zoos who instigated much of the collecting were often driven on by the demands of the general public. Poor communications, dangerous travelling conditions, bad techniques of preservation and the inaccessibility of many of the localities, all helped to increase interest in exotic animals. It must be

FIGURE 1
Two of the Tasmanian Wolves acquired by Mr Gellibrand for Leeds Museum in 1869 (destroyed during a bombing raid in March 1941).

remembered that the public at large had little or no opportunity to see creatures other than in museums, as even zoos were few and far between (Figs. 2 & 3).

Naturalists, as collectors of objects, really came into their own towards the end of the last century. Collecting to excess was not restricted to tropical climes, as many of our native animals and plants were also put under pressure by collectors. There is little doubt that collecting some species damaged the viability of populations, resulting in restrictive distributions. The activities of naturalists are usually blamed for this decrease in the flora and fauna. In particular, members of organizations like the Oological Society, now renamed the Jordain Society, and the Botanical Exchange Club were criticized for collecting 'rare' species to excess for sale and exchange.

FIGURE 2
Educational visit to Leeds City Museum, circa 1910.

Such over-enthusiasm for the collecting of natural objects has resulted in recent years in a general backlash which has affected museums and amateur collectors alike. Conservationists and concerned professional and amateur naturalists took the view that the collecting of animals and plants had to be brought under control (Figs. 4 & 5).

Over the past thirty years much legislation has been passed on many aspects of natural history, culminating in the Wildlife and Countryside Act of 1981. The modern era of natural history legislation began with the Protection of Birds Act of 1954 (amended 1967). This paved the way for the protection by law of such diverse animals as the Badger (Badgers Act 1973) and the three snails *Myxas glutinosa*, *Catinella (Quickella) arenaria* and *Monacha (Monacha) cartusiana*, protected under the Wildlife and Countryside Act of 1981. As well as national laws, we are also governed by international laws, treaties and conventions such as the Washington Convention of March 1973. This Convention on International Trade in Endangered Species of Wild Fauna and Flora aims to 'prevent transfrontier commercial trade in animals and plants, alive or dead, or in any readily recognizable parts or products of animals and plants of endangered species and to bring such trade in potentially endangered species under supervision' (Dollinger 1983).

LEEDS SCHOOLS' MUSEUM SCHEME,

UNDER THE AUSPICES OF
THE CITY OF LEEDS EDUCATION COMMITTEE, and
THE LEEDS AND DISTRICT TEACHERS' ASSOCIATION (N.U.T.).
and with the sanction of H. HOLMAN, Esq., H.M.I.S., on behalf of the Board of Education.

SEVENTH SESSION, 1907-8.

Chairman of the Museum Committee—	*Hon. Secretary—*	*Hon. Lecturer—*
Mr. J. W. Jacob,	Mr. F. Shepherd,	Mr. H. Crowther, F.R.M.S.,
Sweet Street Council School.	Chapeltown Council School.	The Leeds Museum.

Subject of Lecture: "SHELLS AND THEIR MAKERS."

EXPLANATORY NOTE.

The Lecture is preceded by lessons in School, directing the children's attention to its most important points, and is followed by an examination of objects in the Museum, bearing upon the subject. Written accounts are afterwards prepared by the children, embodying the points they have noted, and further supplemented, where possible, by their own observations out-of-doors, in school, or at home. The children are encouraged to keep records of such observations.

AIMS OF LECTURE:—

1.—To stimulate interest in local molluscs, or animals which make shells.
2.—To draw attention to the main points in the structure of a mollusc, so far as they help to explain its life and habits
3.—To enable the children to take an intelligent interest in the specimens of shells exhibited in the Museum.

HEADS OF LECTURE:—

	ILLUSTRATIONS FOUND IN ROOMS
1.—HOW TO RECOGNISE MOLLUSCS, OR THOSE ANIMALS WHICH MAKE SHELLS FOR THE PROTECTION OF THEIR SOFT BODIES	B, C, E, F.
2. THE STRUCTURE AND HABITS OF THE COMMON GARDEN SNAIL AND THE FRESH-WATER MUSSEL	B, C, E, F.
3. THE MAKING OF A SHELL	B, E.
4. THE GREAT GROUPS OF SHELL-MAKERS ...	C, F.
5.—SQUIDS AND CUTTLES	C, F.
6.—THE DISTRIBUTION OF MOLLUSCS	C, F.
7.—THE INFLUENCE OF CLIMATE ON MOLLUSCS ...	C, F.
8.—THE FOOD OF MOLLUSCS	——
9.—HOW SHELL-MAKERS PROTECT THEMSELVES ...	B, C, E, F.
10.—MOLLUSCS AS FOOD	C, F.
11.—SOME USES OF SHELLS: Dress; Ornament; Money.	A, D.
12.—MOLLUSCS: Useful; Injurious.	

FIGURE 3
Poster for a schools' natural history lecture at Leeds Museum, 1907–8.

FIGURE 4
The aftermath of a bombing raid on Leeds City Museum in March 1941.

The protection of single species or groups of related species is important on a world-wide scale. However, I contend that within Britain this is much less important than the protection of habitats. A move in this direction can be found in the Wildlife and Countryside Act under the supervision of the Nature Conservancy Council which has tried to pre-empt the Berne Convention of June 1982, ratified by the United Kingdom, requiring governments to protect habitats of importance for the conservation of wildlife (Article 4, Berne Convention).

Conservationists would like many more animals and plants to receive protected status, arguing that alternative methods of recording, such as photography, can be used, and that collecting is, in the main, unnecessary. Photography is often considered as an alternative to collecting, but although it may fulfil the personal instinct to collect, does it really help in the study of natural history? It is unfortunate that in the majority of cases the identification of the animal or plant must be established before photography takes place. It is often very difficult, if not impossible, to identify most groups down to species level from photogaphs. The need to collect for identification purposes is perhaps even more essential today than ever before. Many of our decisions about the management of Nature

Reserves, as well as the control of pests in the home and in agriculture, are based on our knowledge of the environment as a whole. If we are to understand and thus be enabled to protect our environment we must be capable of identifying all the animals and plants which make up this complex world of ours. It is unacceptable to record only those animals and plants which can be identified in the field: we must be able to collect material for comparison and anatomical study. Many of our invertebrates, including some of the species already protected by law, can only be identified by dissection; for example, the land snail *Catinella arenaria* is indistinguishable in many cases from *Succinea (Succinella) oblonga* without detailed anatomical study.

FIGURE 5
Part of the Natural History storage at Leeds City Museum.

If the law is not to become even more involved in the realm of the naturalist we must be seen to be putting our own house in order. Some museum authorities have now accepted the Museums Association Code of Practice and the majority of museum staff now support a voluntary Code of Ethics. The Code of Practice states, for example, that biological material must not be acquired in contravention of any national or international wildlife legislation. The Code of Ethics considers such difficult areas as public access to environmental records and the inherent conflicts of interest in building up personal collections. Perhaps it is time that we, the Yorkshire Naturalists' Union, produced our own code of practice, so that we are not accused in the future of being the cause of further losses to our native flora and fauna. If we do not control our instinctive desire to collect, the law will. If we or the law fail in this duty to our heritage, perhaps we should rename mankind and call him *Homo acquisitivus* or Man the Collector!

Acknowledgements
I would like to thank all those within and outside the Yorkshire Naturalists' Union for all their help and advice in the production of this paper. In particular, I would like to thank

the staff of the Area Museum and Art Gallery Service for Yorkshire and Humberside, the Director and the staff of Leeds City Museums, and, most importantly, my wife Barbara without whose help and advice this paper would never have been completed.

References

Bazin, G. (1967) *The Museum Age*. Desoer, Brussels.
Brears, P. C. D. B. (1984) Temples of the Muses: The Yorkshire Philosophical Museums, 1820–50. *Mus. J.* **84**: 3–19.
Clark, E. K. (1924) *The History of 100 years of Life of the Leeds Philosophical and Literary Society*. Leeds.
Dollinger, P. (1983) Legislation. *Naturopa* No. 45.
Mills, J. F. (1973) *Treasure Keepers*. Aldus-Jupiter, London.
Norris, A. (1985) An historical review of Yorkshire Mollusca. *J. Conch.* **32**: 1–8.
Museums Association (1977) *Code of Practice for Museum Authorities*.
Museums Association (1983) *Code of Practice for Museum Curators*.
Wittlin, A. S. (1949) *The Museum: its History and its Tasks in Education*. Routledge & Kegan Paul, London.

BOOK REVIEW

British Naturalists' Association Guide to Ponds and Streams by **John Clegg** and **Guide to Fields, Farms and Hedgerows** by **Brian Lee**. Pp. 128, illustrated in colour and black and white. The Crowood Press, 1985. £7.50 each.

The British Naturalists' Association, eighty years old in 1985, continues to flourish partly because of the appeal to amateurs of its quarterly journal *Countryside*. Its decentralized organization is another factor in its success, its Secretary being domiciled in Northamptonshire, its Editor in Lincolnshire and the President of the Youth Section in Durham; and there are largely autonomous branches everywhere that organize field excursions in the summer and talks on natural history in the winter. To mark its 80th year the Association is publishing a series of Guides, two of which have already appeared and are noticed here. David Bellamy, in a preface common to both, pays tribute to John Clegg, who when he was Curator of Haslemere Educational Museum, introduced Bellamy to the fauna and flora of fresh water habitats. Clegg has been Curator of Natural History at other museums, including Torquay and the Gilbert White Museum at Selborne, and he brings his wide knowledge of freshwater biology and his educational skills to the production of the *Guide to Ponds and Streams*. There are excellent introductory sections on water as a medium for life and ponds and streams in an historical context, and short sections at the end on ecology and methods of study. In between, plants receive twenty and animals nearly four times as many pages. All the illustrations are good, and some of those in colour are especially pleasing. Brian Lee is a professional teacher, and contributes regularly to *Countryside*. The introductory section to his *Guide to Fields, Farms and Hedgerows* is an excellent brief account of 'the shaping of the land'. In fact, throughout the book the author gives a balanced view of controversial matters such as the conflict between farming and wildlife interests; as he says, they can and must coexist. At one point he mentions 'giant hogweed'; unfortunately the scientific name is given as *Heracleum sphondylium*, which of course refers to the common native plant even the 'alarmist press' to which he refers unfavourably would not stigmatize as dangerous. 'Plants' are allocated a separate section from 'Trees and shrubs', and these chapters, together with those on birds and mammals, receive roughly equal space, while invertebrates receive rather less. The book is well illustrated. There is quite a wide market for the British Naturalists' Association approach, and these well produced and reasonably priced guides should be a success.

FHB

PARASITES OF BRITISH, LAKE-DWELLING LEECHES

S. M. SPELLING and J. O. YOUNG
Department of Zoology, University of Liverpool, P.O. Box 147, Liverpool L69 3BX

Introduction

Metacercarial and adult stages of digenean trematodes, the cysticercoid stage of cestodes, nematodes, microsporidia and various blood parasites have been recorded as parasites of leeches (Klemm 1971). In Britain, however, very few reports of these parasites have been made.

Lal (1959) recorded metacercariae of *Cercaria valvatae*, infesting the leech, *Helobdella stagnalis* (L.), from Duddingston Loch, near Edinburgh. The illustration of the metacercaria in the publication suggests it is that of *Apatemon gracilis* (Rudolphi) Szidat. Canning *et al* (1973) recorded metacercariae of *A. gracilis* and *Cotylurus cornutus* (Szidat) in the leeches, *Erpobdella octoculata* (L.), *Glossiphonia complanata* (L.), and *H. stagnalis*, and the mastogophoran protozoans, *Trypanosoma* sp. in *Hemiclepsis marginata* (Müll.) and *Crytobia borelli* in *H. marginata* and *Piscicola geometra* (L.) from Slapton Ley, Devon. Pike (1968) reported the cysticercoid stage of two cestodes, *Haploparakis cirrosa* (Krabbe) and *Kowalewskius parvula* (Kowalewski), from the botryoidal tissue of *E. octoculata* collected from a pool at Llynheil, South Wales. The latter cestode species is a synonym for *Microsomacanthus parvula* (Kowalewski), which was recorded in *E. octoculata* collected from a pond near Reading, England by Soliman (1955). In the laboratory, Lewis and Ball (1979, 1980) artificially infected the crop wall of *H. marginata*, collected from the River Lee in southern England, with the epimastigotes of *Trypanosoma cobitis* (Mitrophanow).

The present work reports on the parasites of the non-parasitic leeches, *E. octoculata*, *G. complanata* and *H. stagnalis*, from fifteen British lakes.

Methods

Leeches were collected from the undersides of stones in ten productive lakes, five in Cheshire and five in Shropshire, England, and five unproductive lakes in Gwynedd, North Wales (see Table 1). Populations of *G. complanata* and *H. stagnalis* are numerically small in the Welsh lakes. Samples were taken from all lakes in January, May and August, 1981. An additional sample was taken from Crose Mere in October.

Each living leech was placed between two glass microscope slides and examined under a binocular dissecting microscope at x 40 magnification. The parasites could usually be identified *in situ*, but occasionally they had to be dissected out of the leech for closer inspection. No attempt was made to examine the leeches for blood parasites.

Metacercariae were excysted using 1% trypsin and 0.6% sodium taurochlorate in Earl's salt solution at 40°C (Canning *et al.* 1973, Blair 1976).

Results

Five species of parasites were identified in the three species of leeches: the metacercarial stages of the three trematodes, *Apatemon gracilis*, *Cotylurus cornutus* and *Cyathocotyle opaca* (Wisniewski), and two microsporidians, *Nosema herpobdellae* Conet and *N. glossiphoniae* Schröder (Tables 1 and 2). An unidentified nematode was also found in the body wall of a single specimen of *E. octoculata* from Llyn Nantlle in the summer.

The metacercariae of *A. gracilis* were found in ovoid cysts in the connective tissue and musculature of the leech hosts. The cysts measured an average of 414 µm (range 386–505; n = 25) in length and 329 µm (range 307–366) in width. The cyst wall was thinnest at the sides, measuring 40 µm (range 35–50), and was thicker at the poles, with one pole always

TABLE 1

Prevalence and mean intensity levels of metacercariae of *Apatemon gracilis* in lake-dwelling leeches. The numbers of leeches which were examined are indicated. Wi = winter; Sp = spring; Su = summer; EO = *E. octoculata*; GC = *G. complanata*; HS = *H. stagnalis*.

Lakes		Number examined			% infection			Mean no. cysts/ infected leech		
		Wi	Sp	Su	Wi	Sp	Su	Wi	Sp	Su
Shropshire										
1. Cole Mere	EO	38	34	37	24	18	46	1.3	2.5	9.4
	GC	11	3	10	0	0	10	0	0	1.0
	HS	62	32	57	60	56	49	3.5	2.4	4.4
2. Crose Mere	EO	47	132	129	49	27	24	3.9	2.4	1.9
	GC	132	150	287	4	3	2	37.4	78.8	19.7
	HS	67	163	299	60	44	13	9.4	5.3	2.2
3. The Mere	EO	66	43	39	35	37	10	3.4	2.6	5.0
(Ellesmere)	GC	39	42	20	10	14	5	1.8	1.5	1.0
	HS	60	49	58	43	41	10	1.5	1.7	1.3
4. Newton Mere	EO	61	55	39	23	18	54	3.4	5.5	2.9
	GC	49	40	35	0	0	0	0	0	0
	HS	60	28	42	0	0	2	0	0	8.0
5. White Mere	EO	43	39	34	13	59	29	3.2	3.5	7.7
	GC	61	40	42	3	5	0	1.0	2.0	0
	HS	59	40	50	39	40	4	1.2	2.2	1.5
Cheshire										
6. Budworth Mere	EO	31	30	49	97	90	31	14.1	10.1	2.6
	GC	47	26	31	2	0	0	1.0	0	0
	HS	37	35	51	26	46	26	2.3	2.2	1.5
7. Petty Pool	EO	53	42	40	74	52	43	4.2	3.7	9.1
	HS	32	49	60	72	69	63	10.1	4.7	4.4
8. Pick Mere	EO	51	35	31	28	11	3	1.8	1.8	1.0
	GC	53	50	42	0	0	0	0	0	0
	HS	31	40	42	0	8	2	0	1.8	1.0
9. Tabley Mere	EO	60	33	37	23	17	3	2.2	2.0	1.0
	GC	50	37	38	0	0	0	0	0	0
	HS	61	57	58	40	30	7	3.0	2.1	2.0
10. Tatton Mere	EO	52	37	24	40	19	13	2.2	1.3	3.0
	GC	46	31	45	0	0	0	0	0	0
	HS	60	52	54	20	33	4	1.8	1.4	3.0
Gwynedd										
11. Llyn Cwellyn	EO	34	0	6	0	—	0	0	—	0
	GC	2	0	0	0	—	—	0	—	—
12. Llyn Dinas	EO	68	34	48	0	0	0	0	0	0
13. Llyn Gaddair	EO	73	44	41	0	0	0	0	0	0
	GC	8	4	1	0	0	0	0	0	0
	HS	1	3	0	0	33	0	0	1.0	0
14. Llyn Gwynant	EO	55	33	4	0	0	0	0	0	0
	GC	0	0	1	—	—	0	—	—	0
	HS	0	0	1	—	—	0	—	—	0
15. Llyn Nantlle	EO	54	40	72	39	80	40	6.2	2.4	3.0
	GC	9	5	8	11	0	0	1.0	0	0
	HS	0	0	4	—	—	0	—	—	0

having a thicker wall than the other. The wall at the thicker pole measured 75 µm (range 57–90) and at the thinner pole 50 µm (range 35–62). The excysted metacercariae measured an average of 402 µm (range 396–586; n = 6) in length and 402 µm (range 347–446) in width.

The parasite was present in all the Cheshire/Shropshire lakes but absent from three of the five Welsh lakes (Table 1). *E. octoculata* and *H. stagnalis* were infected in eleven lakes and *G. complanata* in six. Highest prevalence levels (cf. Margolis *et al.* 1982) occurred in *E. octoculata* and *H. stagnalis*, and a maximum value of 97% was obtained for the former leech from Budworth Mere and of 72% for the latter from Petty Pool, in winter. *G. complanata* gave the highest value of 14% from The Mere (Ellesmere) in spring. *E. octoculata* also exhibited the highest mean intensity of infection (cf. Margolis *et al.* 1982) with a maximum of 14.1 cysts per infected leech from Budworth Mere in winter. The highest mean recorded for *H. stagnalis* was 10.1 cysts, from Petty Pool in winter, and for *G. complanata* 78.8 cysts from Crose Mere in spring. It is difficult to identify any seasonal trends in prevalence and mean intensity levels, though in the Cheshire meres both seemed to decline from winter through to summer.

The metacercariae of *C. cornutus* were present in pear-shaped cysts, usually in the reproductive organs of the leech. The cysts measured an average of 437 µm (range 406–505; n = 25) in length and 386 µm (range 337–416) in width. The cyst wall was of a constant thickness around the cyst, and averaged 20 µm (range 15–25). An excretory pore was readily visible at the posterior end of the cyst. Only one excysted metacercaria was obtained and this measured 386 µm in length and 306 µm in width.

The parasite was recorded from eight of the Cheshire/Shropshire meres and one of the Welsh lakes (Table 2). *E. octoculata* were parasitized in seven lakes, *H. stagnalis* in six and *G. complanata* in four. Prevalence levels were highest for *E. octoculata* and *G. complanata*, with a maximum value of 94% recorded for *G. complanata* from Budworth Mere in winter. In this same lake, *E. octoculata* had a maximum prevalence level of 88% in winter and *H. stagnalis* of 37% in spring. Highest mean intensities were also recorded from Budworth Mere for *G. complanata* and *E. octoculata*, at 18.3 cysts in winter and 9.7 cysts in spring, respectively. A maximum average of 6.7 cysts was obtained for *H. stagnalis* from Crose Mere in the summer. As for *A. gracilis*, there was some indication for a decrease in the prevalence and mean intensity levels from winter to summer.

The metacercariae of *C. opaca* were present in thick-walled spherical cysts located in the connective tissue and musculature of the leeches. The cysts measured 493 µm (range 455–515; n = 25) in diameter, and the cyst wall had an average thickness of 45 µm (range 33–50). Attempts to excyst the metacercariae were unsuccessful.

The parasite was recorded in six of the Cheshire/Shropshire meres but in none of the Welsh lakes (Table 2). *E. octoculata* were infected in six lakes, but *H. stagnalis* and *G. complanata* in Crose Mere only, where the parasite was recorded in single specimens. The infected specimen of the former leech species contained 1 cyst and was collected in summer, whilst the specimen of the latter leech contained 4 cysts and was obtained in the supplementary sample taken in the autumn (see methods), and, consequently, this record does not appear in Table 2. Maximum prevalence and mean intensity levels recorded for *E. octoculata* were 24% from Cole Mere in summer and 9.0 cysts in Tatton Mere in winter, respectively. The paucity of data prohibits comments on seasonal changes.

The microsporidians, *N. herpobdellae* and *N. glossiphoniae*, have been found only once previously, in Belgium and Germany respectively. In the present study, the former species was present in large, white tumours in the connective tissues of *E. octoculata*, and it has been fully described by Spelling and Young (1983). The parasite was recorded in five of the Cheshire/Shropshire meres and in one of the Welsh lakes. The highest prevalence level of 32% was obtained from Pick Mere in winter (Table 2).

N. glossiphoniae was found in a single specimen of *G. complanata* collected from Crose Mere in the additional autumn sample, and has been fully described by Spelling and Young (in press). It was present in the muscle cells, and appeared as a pale white tumour on the ventral side of the leech.

TABLE 2

Prevalence and mean intensity levels of metacercariae of (A) *Cotylurus cornutus* and (B) *Cyathocotyle opaca* and prevalence levels of (C) the microsporidian, *Nosema herpobdellae*, in lake-dwelling leeches. See Table 1 for lakes sampled, numbers of leeches examined, and explanation of symbols.

		(A)						(B)						(C)		
		% Infection			Mean no. cysts/ infected leech			% Infection			Mean no. cysts/ infected leech			% Infection		
		Wi	Sp	Su	Wi	Sp	Su	Wi	Sp	Su	Wi	Sp	Su	Wi	Sp	Su
1.	EO	5	0	3	1.5	0	1.0	8	3	24	1.0	1.0	1.2	0	0	0
	GC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	HS	5	0	0	1.0	0	0	0	0	0	0	0	0	0	0	0
2.	EO	2	1	1	1.0	1.0	1.0	2	5	19	1.0	2.7	2.5	6	2	1
	GC	16	6	4	1.4	2.2	6.7	0	0	0	0	0	0	0	0	0
	HS	2	1	2	6.0	1.0	1.4	0	0	< 1	0	0	0	0	0	0
3.	EO	0	0	0	0	0	0	0	0	0	0	0	0	3	0	8
	GC	0	2	0	0	1.0	0	0	0	0	0	0	0	0	0	0
	HS	5	0	0	1.0	0	0	0	0	0	0	0	0	0	0	0
4.	EO	0	0	0	0	0	0	0	0	0	0	0	0	0	4	5
	GC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	HS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5.	EO	0	0	0	0	0	0	2	3	3	1.0	1.0	1.0	0	0	0
	GC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	HS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.	EO	88	87	8	7.6	9.7	1.8	0	0	0	0	0	0	2	0	0
	GC	94	73	26	18.3	17.2	6.5	0	0	0	0	0	0	0	0	0
	HS	29	37	2	4.3	1.9	1.0	0	0	0	0	0	0	0	0	0

7.	EO	2	0	0	1.0	0	0	4	0	0	1.0	0	0	0	0	0
	HS	3	2	0	1.0	1.0	0	0	0	0	0	0	0	0	0	0
8.	EO	4	0	0	2.0	0	0	0	0	0	0	0	0	32	0	0
	GC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	HS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9.	EO	22	10	3	1.8	1.3	1.0	8	0	0	1.0	0	0	0	0	0
	GC	8	3	3	2.3	1.0	1.0	0	0	0	0	0	0	0	0	0
	HS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10.	EO	0	0	0	0	0	0	2	0	0	9.0	0	0	0	0	0
	GC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	HS	0	4	0	0	1.0	0	0	0	0	0	0	0	0	0	0
11.	EO	0	—	0	0	—	0	0	—	0	0	—	0	0	—	0
	GC	0	—	—	0	—	—	0	—	—	0	—	—	0	—	—
12.	EO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13.	EO	0	0	0	0	0	0	0	0	0	0	0	0	3	2	0
	GC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	HS	0	0	—	0	0	—	0	0	—	0	0	—	0	0	—
14.	EO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GC	—	—	0	—	—	0	—	—	0	—	—	0	—	—	0
	HS	—	—	0	—	—	0	—	—	0	—	—	0	—	—	0
15.	EO	11	0	0	1.7	0	0	0	0	0	0	0	0	0	0	0
	GC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	HS	—	—	0	—	—	0	—	—	0	—	—	0	—	—	0

TABLE 2

Prevalence and mean intensity levels of metacercariae of (A) *Cotylurus cornutus* and (B) *Cyathocotyle opaca* and prevalence levels of (C) the microsporidian, *Nosema herpobdellae*, in lake-dwelling leeches. See Table 1 for lakes sampled, numbers of leeches examined, and explanation of symbols.

		(A) % Infection			(A) Mean no. cysts/infected leech			(B) % Infection			(B) Mean no. cysts/infected leech			(C) % Infection		
		Wi	Sp	Su	Wi	Sp	Su	Wi	Sp	Su	Wi	Sp	Su	Wi	Sp	Su
1.	EO	5	0	3	1.5	0	1.0	8	3	24	1.0	1.0	1.2	0	0	0
	GC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	HS	5	0	0	1.0	0	0	0	0	0	0	0	0	0	0	0
2.	EO	2	1	1	1.0	1.0	1.0	2	5	19	1.0	2.7	2.5	6	2	1
	GC	16	6	4	1.4	2.2	6.7	0	0	0	0	0	0	0	0	0
	HS	2	1	2	6.0	1.0	1.4	0	0	< 1	0	0	0	0	0	0
3.	EO	0	0	0	0	0	0	0	0	0	0	0	0	3	0	8
	GC	0	2	0	0	1.0	0	0	0	0	0	0	0	0	0	0
	HS	5	0	0	1.0	0	0	0	0	0	0	0	0	0	0	0
4	EO	0	0	0	0	0	0	0	0	0	0	0	0	0	4	5
	GC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	HS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5.	EO	0	0	0	0	0	0	2	3	3	1.0	1.0	1.0	0	0	0
	GC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	HS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.	EO	88	87	8	7.6	9.7	1.8	0	0	0	0	0	0	2	0	0
	GC	94	73	26	18.3	17.2	6.5	0	0	0	0	0	0	0	0	0
	HS	29	37	2	4.3	1.9	1.0	0	0	0	0	0	0	0	0	0
7.	EO	2	0	0	1.0	0	0	4	0	0	1.0	0	0	0	0	0
	HS	3	2	0	1.0	1.0	0	0	0	0	0	0	0	0	0	0
8.	EO	4	0	0	2.0	0	0	0	0	0	0	0	0	32	0	0
	GC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	HS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9.	EO	22	10	3	1.8	1.3	1.0	8	0	0	1.0	0	0	0	0	0
	GC	8	3	3	2.3	1.0	1.0	0	0	0	0	0	0	0	0	0
	HS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10.	EO	0	0	0	0	0	0	2	0	0	9.0	0	0	0	0	0
	GC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	HS	0	4	0	0	1.0	0	0	0	0	0	0	0	0	0	0
11.	EO	0	—	0	0	—	0	0	—	0	0	—	0	0	—	0
	GC	0	—	—	0	—	—	0	—	—	0	—	—	0	—	—
12.	EO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13.	EO	0	0	0	0	0	0	0	0	0	0	0	0	3	2	0
	GC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	HS	0	0	—	0	0	—	0	0	—	0	0	—	0	0	—
14.	EO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GC	—	—	0	—	—	0	—	—	0	—	—	0	—	—	0
	HS	—	—	0	—	—	0	—	—	0	—	—	0	—	—	0
15.	EO	11	0	0	1.7	0	0	0	0	0	0	0	0	0	0	0
	GC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	HS	—	—	0	—	—	0	—	—	0	—	—	0	—	—	0

Discussion

Of the five parasites found in the present study, only two, *A. gracilis* and *C. cornutus*, have hitherto been reported from British leeches, whilst the other three, *C. opaca*, *N. herpobdellae* and *N. glossiphoniae*, are new records.

Identification of the trematodes was from metacercariae only, and this is not as satisfactory as from the adult flukes. Attempts were made to obtain adults by feeding heavily parasitized leeches to week-old Khaki-Campbell ducklings, but without success. However, the shape, structure and size of the metacercariae obtained in the present study agreed closely with published information on each of the three trematode species (Iles 1960, Vojtek *et al.* 1967, Raishite 1968a, Vojtek 1971, Canning *et al.* 1973; Sudarikov 1974, Skyrabin 1974, Dubois 1979). With regard to *Apatemon*, on the basis of the hosts infected and the location of the parasites within them, the parasite would be assigned to the sub-species *A. gracilis minor* (Yamaguti) (see McDonald 1969).

The first intermediate hosts of the trematodes recorded in this investigation are mainly freshwater snails and the final hosts are waterfowl (McDonald 1969, Erasmus 1972). Interestingly, the occurrence of these parasites in the fifteen lakes sampled can be explained readily in terms of the presence of these hosts. The diversity and abundance of snails and wildfowl are much greater in the eutrophic Cheshire/Shropshire meres than in the unproductive Welsh lakes (Reynolds 1979, Young 1980), which matches the wider occurrence of the parasites in the former group of lakes. Further, Llyn Nantlle was the only Welsh lake to support substantial prevalence and mean intensity levels, and this lake is the most productive in this trophic grouping, with more abundant snails (unpublished data). The absence of *C. opaca* from the Welsh lakes may be explained by the absence of the snail, *Bithynia tentaculata* (L.), which is the only reported first intermediate host of the parasite.

The present and very limited previous data (Canning *et al.* 1973 — Slapton Ley, England; Raishite 1967, 1968b, 1969 and Bayanov and Kussaya 1972 — Russia; Dobrowolski 1958 — Poland; Vojtek *et al.* 1967 — Czechoslovakia) indicate that prevalence and mean intensity levels of trematode metacercariae in leeches can vary substantially not only between leech species but also between different populations of the same species. No comprehensive seasonal data are available as yet to allow interpretation of any pattern of infection in terms of the life cycle of the host. Only occasionally have seasonal trends been identified. In the present study there appeared to be a decrease in prevalence and mean intensity levels of *A. gracilis* and *C. cornutus* from winter to summer in some lakes. Canning *et al.* (1973) found higher prevalence levels of both these parasites in September than in March, Dobrowolski (1958) found little seasonal variation in levels of *A. gracilis* in leeches except for a fall during the recruitment period of young, and Raishite (1969) observed that levels of this same parasite increased in late summer.

No information is available on the effects of trematode parasites on leeches or their population biology in the field. In the laboratory, Iles (1960) found that the penetration of cercariae of *A. gracilis* into *Erpobdella testacea* (Savigny) stimulated violent movement of the host and the production of large quantities of mucus which was not thought to prevent penetration. Leeches were shown to withstand heavy infections with such leeches even breeding and depositing cocoons, but it was assumed that extreme intensities of infection would be fatal. Raishite (1967) also reported that *E. octoculata* writhed and exuded large amounts of mucus in the presence of cercariae of this same parasite, whilst *G. complanata* remained passive. In contrast to the conclusions of Iles (1960), it was thought that mucus was an effective barrier to infection and that this could only occur when the mucous layer was thin. There was no evidence of increased immunity with age or prior exposure to parasites. In the present and several previous studies (see above), prevalence levels of *A. gracilis* were usually found to be highest in *E. octoculata*, slightly lower in *H. stagnalis*, and lowest in *G. complanata*. Raishite (1967) concluded from his laboratory experiments that this difference could be due to cercarial preference of hosts. Palmierie and Jones (1976) have described similar laboratory experiments on *E. octoculata* to those of Raishite (1967).

More detailed laboratory and field studies on the effects of the cercarial and metacercarial stages of trematodes on the survival, reproduction and behaviour of leeches are much needed.

No previous ecological studies have been made on the occurrence of the microsporidian, *Nosema*, in leeches. In the present investigation, *N. herpodbdellae* was recorded in six of the fifteen lakes sampled, but the few data make inter-lake comparisons difficult. There is no distinct pattern as in the case of the trematodes. Indeed, how the parasite is dispersed and how leeches become infected is not known. The rarity of infection of *N. glossiphoniae* is interesting, particularly in view of the relative prevalence of *N. herpobdellae* in leeches from the same location. At such a low level, how is the parasite population maintained? The answer may lie in the presence of another, unidentified host(s), despite the fact that most *Nosema* spp. are fairly host specific. As for the trematodes, much laboratory and field research is required to examine the effects of *Nosema* on the leeches and their population biology.

Summary

An examination of three species of leeches, *Erpobdella octoculata*, *Glossiphonia complanata* and *Helobdella stagnalis*, from productive and unproductive lakes revealed the presence of five parasitic species, including the metacercarial stage of three trematodes, *Apatemon gracilis*, *Cotylurus cornutus* and *Cyathocotyle opaca*, and two microsporidians, *Nosema herpobdellae* and *N. glossiphoniae*. The last three parasites have not been recorded previously in British leeches. Prevalence and mean intensity levels are given, and inter-lake comparisons made. The findings of the present and previous studies on these parasites in leeches are discussed.

Acknowledgements

We are indebted to the owners of the various lakes for permission to collect leeches. Thanks are expressed to the Nature Conservancy Council, Shrewsbury and to the University of Manchester for allowing us to remove animals from Crose Mere and Tabley Mere, respectively. We are grateful to the Natural Environment Research Council for financial support.

References

Bayanov, M. G. and Kussaya, N. A. (1972) Leeches in the Bashkir A.S.S.R. as intermediate hosts of bird helminths. *Trudy bashkir. sel.' — Khoz. Inst.* **17**: 33–45. (In Russian.)

Blair, D. (1976) Observations on the life-cycle of the strigeod trematode *Apatemon (Apatemon) gracilis* (Rudolphi, 1819) Szidat, 1928. *J. Helminth.* **50**: 125–131.

Canning, E. U., Francis, E. G., Croll, N. A. and Lyons, K. M. (1973) The natural history of Slapton Ley nature reserve: VI. Studies on the parasites. *Fld Stud.* **3**: 681–718.

Dobrowolski, K. A. (1958) Parasites of leeches of Druzno lake. *Acta parasit. pol.* **6**: 179–194. (In Polish, with English summary.)

Dubois, G. (1979) Importance des phases post-cercariales dans la subdivision saus-genres de certains Gennes de Strigeoidea. *Revta. ibér. Parasit.* **39**: 529–536.

Erasmus, D. A. (1972) *The Biology of Trematodes*. Edward Arnold, London.

Iles, C. (1960) The larval trematodes of certain freshwater molluscs. II. Experimental studies on the life-cycle of two species of Furcocercariae. *Parasitology* **50**: 401–417.

Klemm, D. J. (1975) Studies on the feeding relationships of leeches (Annelida: Hirudinea) as natural associates of molluscs. *Sterkiana* **58**: 1–50.

Lal, M. B. (1959) A new leech-infecting cercaria from Duddingston Loch, Edinburgh. *Nature, Lond.* **183**: 697–698.

Lewis, J. W. and Ball, S. J. (1979) Attachment of the epimastigotes of *Trypanosoma cobitis* (Mitrophanow, 1883) to the crop wall of the leech vector *Hemiclepsis marginata*. *Z. Parasit. Kde.* **60**: 29–36.

Lewis, J. W. and Ball, S. J. (1980) Ultrastructure of the epimastigotes of the fish trypanosome *Trypanosoma cobitis* (Mitrophanow 1883), in the crop of the leech vector *Hemiclepsis marginata*. *J. Parasit.* **66**: 948–953.

McDonald, M. E. (1969) Catalogue of helminths of waterfowl (Anatidae). *Bur. Sport Fish. Wildl. Sp. Scient. Rep. — Wildl. No. 126, Washington D.C.*

Margolis, L., Esch, G. W., Holmes, J. C., Kuris, A. M. and Schad, G. A. (1982). The use of ecological terms in parasitology (report of an ad hoc committee of the American Society of Parasitologists). *J. Parasit.* **68**: 131–133.

Palmierie, J. R. and Jones, H. A. (1976) The effects of leech behaviour on penetration and localization of *Apatemon gracilis* (Trematoda: Strigeidae) cercariae and metacercariae. *Gt. Basin Nat.* **36**: 97–100.

Pike, A. W. (1968) Notes on some cystercoids from pulmonate molluscs and leeches in British freshwaters. *J. Helminth.* **42**: 131–138.

Raishite, D. I. (1967) Pecularities of infection of leeches with cercariae of the trematode *Apatemon gracilis minor* (Yamaguti, 1933). *Zool. Zh.* **46**: 1846–1849. (In Russian.)

Raishite, D. I. (1968a) The trematode *Apatemon gracilis* (Rud. 1819), Szidat 1928 (Strigeidae). *Trudȳ gel'mint. Lab.* **19**: 154–163. (In Russian.)

Raishite, D. I. (1968b) Infection of freshwater leeches in the Volga delta by *Apatemon gracilis* metacercariae. *Trudȳ astrakh. zapov.* **11**: 247–254. (In Russian.)

Raishite, D. I. (1969) The degree of metacercarial infection of freshwater leeches in the Volga and Neman deltas. *Problemȳ Parazit.* **1**: 196–199. (In Russian.)

Reynolds, C. S. (1979) The limnology of the eutrophic meres of the Shropshire-Cheshire plain: A review. *Fld Stud.* **5**: 93–173.

Skyrabin, K. I. (1974) *Trematodes of Animals and Man. Volume 25, Principles of Trematodes*, Moscow. (In Russian.)

Soliman, K. N. (1955) Observations on some helminth parasites from ducks in Southern England. *J. Helminth.* **29**: 17–26.

Spelling, S. M. and Young, J. O. (1983) A redescription of *Nosema herpobdellae* (Microspora: Nosematidae), a parasite of the leech *Erpobdella octoculata* (Hirudinea: Erpobdellidae). *J. Invert. Path.* **41**: 350–368.

Spelling, S. M. and Young, J. O. (in press) *Nosema glossiphoniae* Schroder re-discovered. *J. Parasit.*

Sudarikov, V. E. (1974) *Cyathocotyle opaca. Trudȳ gel'mint. Lab.* **24**: 182–194. (In Russian.)

Vojtek, J. (1971) Beitrag zur Kenntnis des Entwicklungszyklus von *Cyathocotyle opaca* (Wisniewski, 1934) n. comb. (Trematoda: Cyathocotylidae). *Z. Parasit. Kde.* **36**: 51–61.

Vojtek, J., Oprviolva, V. and Vojtkova, L. (1967) The importance of leeches in the life-cycle of the order Strigeidida (Trematoda). *Folia Parasit. Praha* **14**: 107–119.

Young, J. O. (1980) A serological investigation of the diet of *Helobdella stagnalis* (Hirudinea: Glossiphoniidae) in British lakes. *J. Zool., Lond.* **192**: 467–488.

BOOK REVIEW

Rocks and Minerals by **Pat Bell** and **David Wright.** Pp. 192, including numerous b/w and colour diagrams and 60 colour identification plates. Hamlyn, 1985. £3.99, paperback.

This small volume is packed with geological information, and provides a concise readable introduction to the field of geology. A 13-page introduction gives useful guidance on equipment and fieldwork, and is followed by sections on igneous, sedimentary and metamorphic rocks which include simple but useful keys for rock identification. The bulk of the volume (135 pages) consists of colour plates of rock and mineral specimens, with descriptive text on the facing page. The quality of the printing is sufficiently good to enable diagnostic features to be seen clearly. A short glossary and index round off the work. Overall, a pleasing, cheap introduction to the subject and one which should prove useful to 'O' and 'A' level geology students and to people wishing to acquire a basic knowledge of rocks and minerals.

DEC

THE AMATEUR AND PROFESSIONAL SCIENTIST: A COMMENT ON LOUIS C. MIALL (1842–1921)

R. A. BAKER
University of Leeds
and
R. A. BAYLISS
Foresterhill College, Aberdeen

One particularly intriguing strand of current interest in nineteenth century science has been the investigations into the nature of the relationships between amateur and professional naturalists and the societies in which they mixed (Allen 1978, Lowe 1976, 1978, Seaward 1982). The work of Professor Miall is of undoubted interest here.

Louis Compton Miall was born in Bradford in 1842, the son of a congregational minister. His life has been recently investigated (Baker & Bayliss 1983) and it is clear that some early influences contributed to his career as a scientist. At Silcoates School he had a particularly helpful teacher and a fellow pupil described as a 'real naturalist'. Miall read a botanical textbook belonging to his medical student brother and some popular scientific literature but had no formal science teaching at school. However, membership of the Todmorden Botanical Society appears to have been an important early influence. This Society, notable for the work of John Nowell (Foster 1980) and Abraham Stansfield (Turner 1906), was founded in 1852 and described in *Nature* as 'among the most efficient field-clubs in the Kingdom' (*Nature* **9**: 97–99, 1873).

Miall's first book was published in 1862, when he was co-author with Benjamin Carrington of *The Flora of the West Riding*. Carrington was a medical practitioner and an authority on Liverworts and published his first work when a student. In an obituary (Pearson 1893) the significant comment was made that 'had he enjoyed moderate health and more leisure, the name of Benjamin Carrington would have ranked amongst the greatest of our Cryptogamic botanists'.

The young Miall earnestly advised aspiring botanists to cultivate 'method, zeal and perseverance', but it was later admitted that the list of plants and localities was 'quite contrary to his maturer teaching' (Wager 1922). A series of papers on the botany of Malham appeared in *The Naturalist* in 1865 and 1866 and he wrote newspaper articles on the natural history and geology of Bradford (1863).

After a brief interval as a teacher, Miall was appointed in 1865 as Secretary to the Bradford Philosophical Society on the recommendation of R. H. Meade, a local physician and entomologist. Meade combined a long professional life in Bradford with substantial work in entomology and arachnology (Savory 1961).

The Society had been revived for the third time in 1839 (Morrell 1985) due in part to the efforts of William Sharp, FRS, Senior Surgeon at the Bradford Infirmary, science teacher and medical research worker (Power 1973). When it was re-established in 1864, Miall became Secretary and Curator a year later.

There were other scientific bodies in and around Bradford in the 1860s. The West Riding Consolidated Natural History Society had been formed in 1861, later to become the Yorkshire Naturalists' Union. The Leeds Philosophical and Literary Society had a large membership and its own premises. Mechanics' Institutes were strong in the West Riding, where biology was an important part of the curriculum (Laurent 1984) and the Huddersfield Naturalists' Society of 1847 remained a thriving Society of largely working class members (Porritt 1898).

One of Miall's duties in Bradford was to establish a museum and another to organize prestigious scientific lectures for the middle class members of the Philosophical Society 'who paid their guinea subscription in return for which they enjoyed the privilege of hearing some of England's best literary and scientific lecturers who for the most part

talked over their audiences' heads'. The rivalry between local societies in Bradford and even between towns was clear when Philosophical Society members were described as belonging to the 'kidgloved aristocracy of the town' (Crebbin 1910).

Miall's contribution to local natural history included membership of the Leeds Naturalists' Club and Scientific Association, a society to which he lectured regularly and of which he was Vice-President (1887–1888) and President (1889–1890). He was also on the staff of the Leeds Philosophical and Literary Society as Assistant Secretary for five years and Curator of the Leeds Museum for 30 years and 'raised the collection to a high position among provincial museums' (Clark 1924).

Miall's work in developing a meaningful museum in Bradford, and later in Leeds, led to a firm conviction expressed later (1877) that 'we have had more than enough of unintelligent collecting and unintelligent records of occurrence'. His self-education as a geologist continued and his own teaching quickly led to forthright views on educational methods. The limitations of this haphazard scientific training were revealed when Miall described meeting one of the lecturers he had invited to Bradford who advised on dissecting techniques; Miall commented that 'to a mere beginner, ignorant and almost helpless, this instruction was memorable, and after fifteen years I look back on it with deep gratitude' (Tylor 1884).

Miall became lecturer in biology in 1875, and a year later professor, at the new Yorkshire College of Science. His Chair embraced the whole of biology and his own work included zoological researches which increasingly centred on entomology with a substantial publication of books and papers as well as works on nature study and education.

By the 1890s, the new academic specialist was becoming more common. Arthur Smithells, friend and chemistry colleague of Miall, had undergraduate and research education in Britain and Germany (Flintham 1977). Walter Garstang (Baker & Bayliss 1984) was educated as a zoologist, became a marine biologist of note and succeeded Miall at the University of Leeds.

Miall developed his own approach to natural history societies and it was to erupt into a public controversy in 1905. At the annual exhibition and conference of the East Riding Nature Study Committee, Miall spoke, and as Sheppard (1905) explained 'acted as a "wet blanket" and almost resulted in the death of the committee and its work'. Miall had apparently objected to the use of dead specimens, and had expressed similar views in his book *House, Garden and Field* (1904); much earlier when appointed Curator of the Bradford Philosophical Society he wrote in an undated autobiographical manuscript 'What was I to do with badly stuffed birds, shells and miscellaneous things which were of no value and in which I myself was not prepared to take any interest?'

Miall felt that the activities and publications of the average natural history society at the turn of the century could be profitless, pointless and pretentious, directing the efforts of people, sometimes with limited time, into fact gathering which took them away from more searching observations and experiments. However, according to both Allen (1978) and Lowe (1978), it is the diversity of interest in those natural history societies that is so striking.

Miall's proposals for natural history societies were clear: there were to be no papers read, as a rule no lectures and no local lists to be prepared, read or printed, 'They are hardly ever worth the paper they are printed on' (Miall 1904). When a Biological Society was formed at the Yorkshire College, a correspondent, clearly quoting Miall's words, recorded its object as 'to keep clear of those long and dry, wretchedly delivered papers which form the staple of the average literary or scientific society, but to have conversations round the table, as it were, upon various topics of biological interest' (Yorkshire College 1900). Thomas Sheppard, Curator of the Hull Museum, joint editor of *The Naturalist* from 1903 to 1932 and a man of varied background involved in numerous scientific activities was equally forthright in his rebuttal of Miall's views.

'With a fair knowledge of the work of natural history societies we can safely say that probably all the 33 societies affiliated with the Yorkshire Naturalists' Union, and the Union itself, would come to an abrupt and untimely end were the Professor's advice acted

upon. But we must remember that the *real* natural history society is not composed of college students taking a course in biology principally for the purpose of obtaining a degree. It is composed of men — largely artisans, who love Nature for Nature's sake, men who are as pleased to see the birds and flowers and insects in their native haunts, to observe their habits, and to leave them unmolested, as is the author of *House, Garden and Field* or anyone else' (Sheppard 1905).

Sheppard added that club members were generally preserving fauna and flora and produced useful publications. He referred to a presidential address to the Y.N.U. by Michael Foster (1899) when the naturalists were described as the 'complement of the University and the Special Society' and their role was to 'serve as an integrator of biological studies'. Sheppard wryly noted that Miall's own society would have nothing to show for its existence other than receipts for tea and biscuits. He recommended people to read Miall's book with its 'charming essays on various biological subjects' but the sting was in the tail as he concluded 'we cannot agree with some of the opinions expressed therein; which it must be remembered are those of a Professor of Biology and cannot be accepted as those of a field naturalist' (Sheppard 1905).

Miall expressed critical views elsewhere on the work of some naturalists. In 1895 in the *Natural History of Aquatic Insects*, he commented: 'It would be much if I could persuade some few working naturalists to lay aside their technical lists and records of parish distribution and study the works of nature with open eyes, seeking above all things to know more of life in its infinitely varied forms.'

When Thomas Woodhead, after a career in the woollen industry and teaching, completed studies in Leeds and Switzerland for his doctorate, Miall (1906) wrote a congratulatory letter: 'It is very encouraging to see that the sterile publications of our Yorkshire naturalists are being replaced by investigations of a truly scientific character.'

Lowe (1976) has pointed out that the importance of natural history societies in the ecological work of Woodhead and others was considerable and has concluded (Lowe 1978) that Miall's 'denunciations of amateurs and local societies must be seen, in part, as the efforts of a professional academic to distance himself from his own self-taught background'. Lowe (1978) considers that Sheppard 'still saw natural history as a cultural pursuit, not a narrow vocation and the naturalist as characterized not by arbitrary titles or qualifications or by base motives of career prospects but by his sense of commitment and wonder, by his love of nature, which is essentially the amateur ideal'.

This is perhaps unfair to Miall whose work seems to show ideals quite as sound as those ascribed to Sheppard. Miall (1904) believed in virtues carried on as he wrote of Pasteur and Darwin to the 'heroic point' — curiosity, observation and experiment. His own museum experience, coping with the dusty rejects of benefactors initially difficult to refuse, seems to have resulted in an exaggerated dislike of faunal and floral lists, dead specimens and the lack of a critical investigative approach: 'It is not systematic but aimless work that I deprecate — work which springs from no real curiosity about Nature and attempts to answer no scientific questions' (Miall 1895).

That Miall could exaggerate to make a point he considered important is clear from his repeated views on the disadvantages of the lecture system (Miall 1897). The tendency to hyperbole does not invalidate his educational ideas and the arguments he used, for example on examinations, are as valid now as when written nearly a century ago.

Miall had the reputation of being a reserved and austere man and even intimidating to the less well informed (Crebbin 1907) and Lowe's (1978) view of his arrogance is understandable. However, scientists closely associated with Miall at the Yorkshire College had a different view of the importance of the work of naturalists and their societies. William G. Smith joined the staff at the Yorkshire College in 1897, collaborated in producing the first vegetation maps in England and eventually became President of the Yorkshire Naturalists' Union (*Naturalist* 1929: 153–156). Miall's son-in-law, Harold Wager, who had a varied career starting with an apprenticeship to a cabinet-maker and years as an Inspector of Schools was a mycologist of note, a Fellow of the Royal Society; he was always sympathetic to both amateurs and professionals (Mason 1930). Similarly,

Garstang during his career was actively involved with amateur science, being the President of a number of societies and helping to revive the waning fortunes of the Leeds Naturalists (Donnan 1951).

A more detailed study of the societies with which Miall was associated is required in order to evaluate what significant work was accomplished and whether Miall's views can be substantiated. A similar investigation of the Aberdeen Working Men's Natural History and Scientific Society (Bayliss & Hannabuss 1983) revealed a small church club, initially meeting in a basement, and being helped for decades by university scientists of the calibre of J. W. H. Trail and J. Arthur Thomson. The varied membership, which included several amateurs of considerable interest and others whose work was on the fringe of professional science, kept the society in existence for many years. A closer analysis of the Yorkshire societies might lead one to conclude that Miall was perhaps too busy to be anything other than a figure-head and too impatient to fully recognize the merits of the kind of societies which had contributed to his own development as a scientist.

Miall is an enigma. He was respected as an excellent teacher, recognized as a researcher of note, was certainly a man who wrote well and with feeling about nature. He displayed surprisingly wide interests in geology, biology, meteorology, history and linguistics, which he continued to pursue at Leeds and in retirement. The provocative statements he expressed in an extreme and controversial manner, presumably to stimulate discussion and draw attention to the problems he saw, encouraged a critical response in others. Typical of these is his comment about the work of natural history societies and their members which well summarizes his opinions: 'I have belonged to many natural history clubs but have found hardly any of them profitable. This must be my excuse for proposing changes which I know beforehand will be unwelcome to many brother naturalists . . . Biological research will in general be found too hard for such a club. Natural history recreations, of an instructive but by no means profound kind, are all that most amateur clubs can wisely attempt' (Miall 1904).

Miall made at least one recorded attempt to offer help and expertise. At the conference of delegates of the Corresponding Societies held at the British Association for the Advancement of Science in Toronto in 1897 (reprinted in the *Halifax Naturalist*, 1898), Professor Miall, who was President of Section D, spoke about possible lines of work that could be attempted by amateurs. He made practical suggestions about attempting work on the life-histories of insects: 'It may be thought that this study of life-histories is not specially suited for the amateurs who compose a large part of local societies. It cannot be denied that the work is hard and has special difficulties . . . I think it is a reproach to the naturalists of our generation that they are content to leave the higher knowledge of insects and devote their whole attention to mechanical details.'

Miall proposed to acquaint any enthusiastic naturalist with the scientific language and methods required by offering to teach an elementary course on *Chironomus* based first at the Yorkshire College in Leeds and if successful then perhaps in London. He concluded 'If we should succeed in carrying out this plan it might lead to a revival of the study of natural history in our country.' Unfortunately it is not known whether or not his proposals were taken up. Clearly at this time he did not appear to believe that this work was 'too hard' for certain individuals but stated that he intended to make no remarks upon the work and influence of local societies.

In the mass of interesting and varied information on provincial scientific activity carried out by amateurs and professionals in the fifty years between 1860 and 1910, Miall remains an important figure, well worthy of continuing attention.

References

Allen, D. E. (1978) *The Naturalist in Britain*, Penguin, Harmondsworth.

Baker, R. A. and Bayliss, R. A. (1983) Louis Compton Miall F.R.S.: Scientist and Educator, 1842–1921. *Notes and Records R. Soc. Lond.* **37**: 201–234.

Baker, R. A. and Bayliss, R. A. (1984) Walter Garstang (1868–1949): zoological pioneer and poet. *Naturalist* **109**: 41–53.
Bayliss, R. A. and Hannabuss, C. S. (1983) Records of the Aberdeen Working Men's Natural History and Scientific Society. Unpublished work.
Carrington, B. and Miall, L. C. (1862) *The Flora of the West Riding*. Pamplin, London.
Clark, E. K. (1924) *The History of 100 years of Life of the Leeds Philosophical and Literary Society*. Jowett and Sowry, Leeds.
Crebbin, A. (1907) James Monckman. *Bradford Scientific Journal* **1**: 194.
Crebbin, A. (1910) Reminiscences of the early days of the Bradford Scientific Association. *Bradford Scientific Journal* **2**: 91–93.
Donnan, J. V. (1951) The Leeds Naturalists' Club, 1870–1950. *Naturalist*: 109–114.
Flintham, A. J. (1977) The contribution of Arthur Smithells F.R.S. to science education. *Hist. Education* **6**: 195–208.
Foster, M. (1899) Presidential address Y.N.U. *Naturalist*: 209–223.
Foster, W. D. (1980) Famous bryologists I. John Nowell of Todmorden, 1802–1867. *Bull. Bryol. Soc.* **35**: 13–20.
Laurent, J. (1984) Science, society and politics in late nineteenth-century England. A further look at Mechanics' Institutes. *Social Studies in Science* **14**: 585–619.
Lowe, P. D. (1976) Amateurs and professionals: the institutional emergence of British plant ecology. *J. Soc. Biblphy. nat. Hist.* **7**: 517–535.
Lowe, P. D. (1978) Locals and cosmopolitans: a model for the social organization of provincial science in the nineteenth century. M.Phil. thesis, University of Sussex.
Mason, F. A. (1930) Harold Wager. *J. Bot., Lond.* **68**: 18–20.
Miall, L. C. (1863) *The Physical Geography and Natural Productions of Bradford and the Neighbourhood*. (A series of papers reprinted from the Bradford Review.) A. Holroyd, Bradford and J. Russell Smith, London.
Miall, L. C. (1865) On the botany of Malham. *Naturalist* **1**: 209–214, 246–251, 277–279, 376–379.
Miall, L. C. (1866) On the botany of Malham. *Naturalist* **2**: 263–266.
Miall, L. C. (1877) Museums. *Nature, Lond.* **16**: 360.
Miall, L. C. (1895) *The Natural History of Aquatic Insects*. Macmillan, London.
Miall, L. C. (1897) *Thirty Years of Teaching*. Macmillan, London.
Miall, L. C. (1898) The study of life-histories by local Societies. *Halifax Naturalist* **2**: 105–108.
Miall, L. C. (1904) *House, Garden and Field*. Arnold, London.
Miall, L. C. (1906) Letter to T. W. Woodhead, 22 November 1906. Archives — Tolson Memorial Museum, Huddersfield.
Morrell, J. B. (1985) Wissenschaft in Worstedopolis: public science in Bradford, 1800–1850. *Brit. J. Hist. Sci.* **18**: 1–23.
Pearson, W. H. (1893) Benjamin Carrington. *J. Bot., Lond.* **31**: 120–122.
Porritt, G. T. (1898) *Presidential Address — Huddersfield Naturalist and Photographic Society*. Huddersfield.
Power, D. A. (1973) William Sharp. *Dictionary of National Biography* **17**: 1356–1357.
Savory, T. (1961) *Spiders, Men and Scorpions*. London.
Seaward, M. R. D., ed. (1982) Yorkshire's role in the origin of some national societies. *Naturalist* **107**: 117–138.
Sheppard, T. (1905) Nature study: ideal and real. *Naturalist*: 22–25.
Turner, J. H. (1906) *Halifax Books and Authors*. Bradford.
Tylor, E. B. (1884) Life of Dr. Rolleston in: Scientific Papers and Addresses by George Rolleston. *1*, (W. Turner ed.). Clarendon Press, Oxford.
Wager, W. (1922) Obituary Notice: Louis Compton Miall, 1842–1921. *Proc. R. Soc. Lond.*, B. **93**: X–XIX.
Yorkshire College (1900) Biological Society. *Gryphon* **3**(3): 55.

FIELD NOTES

Coelichneumon bilineatus (Gmel.) **and** *C. consimilis* (Wesm.) **(Hymenoptera, Ichneumonidae) in Yorkshire.**

Coelichneumon bilineatus (Gmelin in Linnaeus, 1790) was amongst a list of parasitic Hymenoptera recorded from the parish of Lastingham, near Pickering, by the Rev. Thomas Ansell Marshall, who resided there for a year or two in the 1860s. This record was published by William Denison Roebuck in 'Yorkshire Hymenoptera: Report on Present State of Knowledge and First List of Species' (Roebuck 1877, Trans. Y.N.U. p. 37) and subsequently (e.g. in the Victoria County History of 1907). Marshall was the doyen of British hymenopterists and published a 'Catalogue of British Hymenoptera: Chrysididae, Ichneumonidae, Braconidae and Evaniidae' (Marshall 1872, Entomological Society of London). His records were accepted without question at the time, but many ichneumons which were 'correctly' identified last century need re-evaluation today, as the current British check-list (Fitton *et al.* 1978) contains nearly twice as many species as Marshall's catalogue. Fortunately, Marshall's collection has survived and his Yorkshire specimens are labelled 'Lastingham' or 'Last', though they do not have determination labels. The bulk of his collection is housed at the British Museum (Natural History), though some duplicate specimens were distributed to other museums. The *Coelichneumon* is at the B.M. (N.H.) and has been redetermined by J. F. Perkins as *C. consimilis* (Wesmael, 1844). This species has not been reported from Yorkshire and is therefore an addition to the county list.

Although this record of *C. bilineatus* has been deleted from the list of Yorkshire ichneumons the species has been collected here. John Wood was a prodigious collector of insects, particularly around his Keighley home, but, although he mounted his specimens beautifully, he did not name them. His specimens were transferred to Cliffe Castle Museum in Keighley; on the death of Rosse Butterfield, the then curator and the Y.N.U. Hymenoptera recorder, they were passed on to William Douglas Hincks, who also took over the recordership. Since I assumed responsibility for the Y.N.U. records of the Hymenoptera Parasitica, I have looked at specimens in several museums and found a specimen of *Coelichneumon bilineatus* in a store box of un-named insects at Cliffe Castle Museum. It was collected by Wood at Allerthorpe Common on 15.9.1928, and is thus the first (and only) Yorkshire specimen.

Coelichneumon species are parasites of Noctuid moths, attacking the prepupae or newly formed pupae. *C. consimilis* has been reared from pupae of the Marbled Green (*Cryphia muralis*).

I am grateful to Dr M. G. Fitton for access to the collection of the British Museum (Natural History) and to Miss M. M. Hartley for the loan of specimens from Cliffe Castle Museum.

Reference

Fitton, M. G., Graham, M. W. R. de V., Bouček, Z. R. J., Fergusson, N. D. M., Huddleston, T., Quinlan, J. and Richards, O. W. (1978) *A Checklist of British Insects, Part 4: Hymenoptera.* 2nd ed. Royal Entomological Society of London.

W. A. Ely

New Craneflies for Yorkshire

Limonia (Limonia) nigropunctata Schummel is a medium-sized, black and yellow cranefly with three dark spots along the costal (fore) margin of the wing and dark front femora. I collected a single specimen at The Terrace, a strip of woodland running along the edge of the Lower Magnesian Limestone near Thurcroft, Rotherham (SK 5089) on 22nd May 1982, while leading a field meeting of the Rotherham Naturalists' Society. This uncommon insect is found in Southern England as far north as Nottinghamshire and

Derbyshire (P. Skidmore, *pers. comm.*) but this record is the first for Yorkshire. The species was also found on the Y.N.U. excursions in V.C.s 61 and 62 in 1985.

L. (L.) masoni Edwards is very similar to *nigropunctata* and may be no more than a colour variety, having a black body and paler front femora. A single example was collected at Moses Seat, Lindrick (SK 5842) on 20th May 1977 by Jane E. Addey and Pamela G. Stenton; a further specimen was collected by myself from a small broadleaf plantation on Loscar Common, Harthill (SK 5080) on 31st May 1984, and a third example was found by me at Lob Wells Wood (SK 5380) on 30th May 1985. This cranefly is a rarity which is known from Derbyshire and a few counties further south, and these three records from the limestone are the only ones for Yorkshire.

On 8th July 1982, I collected *L. (Dicranomyia) omissinervis* (de Meijere) at Morley Pond (SK 3996). The carr surrounding the pond has since been largely cleared. This rare cranefly has been recorded from Aviemore and the English/Welsh border only.

On 24th June 1984, I collected several examples of *L. (Rhipidia) uniseriata* (Schiner) during the Y.N.U. excursion to Caydale (SE 5386). This scarce insect is usually found around rotting wood in Southern England, and this record from North Yorkshire is a significant extension to its known range.

I am grateful to P. Skidmore for confirming my identification of the original *L. masoni* and to A. E. Stubbs for confirming my identification of the *L. uniseriata*.

W. A. Ely

PONDWEED RECORDS

W. A. SLEDGE

Early this year I received from the Biological Records Centre at Monks Wood Experimental Station lists of *Potamogeton* records from South-West Yorkshire (V.C. 63) and Mid-West Yorkshire (V.C. 64). These covered six species and four hybrids and, of the 144 records sent, all but eight were based upon collections preserved in institutional or private herbaria which had been seen and examined by Mr J. E. Dandy or Dr G. Taylor. Of the 78 records from V.C. 64, one only had not been seen by them and this was a record for *P. compressus* L., said to have been found at Ripon.

Since the only confirmed Yorkshire record for this species was made in the late 1700s by Teesdale at Hovingham (V.C. 62), I asked Mr Preston, who had sent me the lists, for any further information which he could supply and was sent a photocopy of the original record card on which the entry was based. This showed that the record was founded on a gathering made by Mr T. Schofield in July 1971 in the canal at Ripon, a six-figure grid reference indicating that the precise locality was close to the junction of the canal with the river Ure. There was no indication that any voucher material had been preserved which might be referred to for confirmation of the determination and the card had been annotated at the Records Centre 'no record from V.C. 64 in Dandy's card index'.

In view of the extreme rarity of this pondweed in Yorkshire I searched in volumes of the *Naturalist* for 1971 and later for a published note on this unusually interesting discovery but could find no reference to the matter, either as a separate field note or as a record incorporated in the annual botanical report for 1971 or subsequent years. I did however find a further record for *P. compressus* in the botanical report on the Y.N.U. excursion to Boroughbridge on June 29–30, 1974 (*Nat.* 1974: 149) where this species is reported as having been noted at Westwick Lock and Cut along with *P. perfoliatus* and *P. pectinatus*. In the botanical report for 1974 (*Nat.* 1976: 112) the *P. compressus* record is repeated but cited as from Roecliffe brickyards and not from Westwick, whereas in the excursion report *P. natans* and *P. berchtoldii* were the pondweeds recorded from Roecliffe brickyards. Both recorders were evidently unaware of the importance of the *P. compressus* record, for no comment is made by either about the interest of the discovery and no claim is made for its being a species new to West Yorkshire.

Since Westwick Lock and Cut are only a mile or two downstream from the junction of the Ripon Canal with the river Ure, the possibility that this rare species had been overlooked there until comparatively recently could not be discounted. It was indeed somewhat heightened by the record in H. H. Slater's *Flora of Ripon* (1885: 165) for *Potamogeton acutifolius* 'between the mouth of the Ripon Canal and Newby Ferry'. In Lees's *Flora of West Yorkshire* (1888: 417) this is rightly rejected as a 'very doubtful' record, but there remained the possibility that Slater's plant might perhaps have been *P. compressus*. In any case a reinvestigation of the pondweeds in these localities was clearly required in view of the uncertainty of the records.

On July 16 Mr R. W. David and I visited the Ripon Canal and Westwick. Amongst the first aquatics to be found in the canal were floating strands of *P. friesii* and further investigations showed this species to be fairly common there. *P. pusillus* was also collected in the canal and x *P. suecicus* (*P. filiformis* x *pectinatus*) was also there and was abundant in the river both near the Ripon Canal and at Westwick, where *P. perfoliatus* and *P. alpinus* were also seen.

The most abundant pondweed in the river Ure hereabouts is x *P. suecicus*. A detailed account of the occurrence and distribution in Yorkshire of this hybrid, one parent species of which is not known to occur anywhere in England, has been published by Dandy and Taylor (*Trans. & Proc. Bot. Soc. Edin.* **34**(3): 348–360 (1946)). This is the pondweed which was recorded in H. H. Slater's *Flora of Ripon* as *P. flabellatus* whilst Lees's records (in *Fl. West Yorks.* 1888: 418) for *P. flabellatus* also refer at least in part, and certainly as to the 'Ripon to Boroughbridge' entry, to x *P. suecicus*. Dr Taylor was attached to one of the Ministries during the war and for five years he was stationed in Harrogate. It was during this period that he worked out in detail the distribution of x *P. suecicus* in Yorkshire. An examination of all the rivers of the Ouse system showed that (*loc. cit.* 351–352) 'this hybrid is apparently restricted in Yorkshire to the rivers Ure and Wharfe and a notable point about this, apart from the absence of *P. filiformis*, is that these two rivers appear to be remarkably deficient in *P. pectinatus* also'. The virtual absence of *P. pectinatus* is all the more remarkable having regard to its frequency in the Ouse, Swale, Derwent and other Yorkshire rivers as well as in canals and other waters in the area.

Three gatherings of *P. friesii* made by Dr Taylor at the Ripon canal in 1940 and 1945 are listed in the sheets sent to me by the Records Centre and a record of his from there is cited in the *Supplement to the Yorkshire Floras* (1941: 110). It is difficult to believe that during many visits to Westwick and Ripon when pondweeds were the main subjects of study that *P. compressus* would have been overlooked by him. The strongly compressed stem of *P. friesii* may have led Mr Schofield and the Boroughbridge recorders to mistake this species for *P. compressus*, but this is a character common to both species whereas the venation of the leaves is so widely different in the two species that confusion between them should not occur. In view of the evidence cited above and the absence of any confirmatory specimen, there does not seem to be any reasonable doubt that the records for *P. compressus* in the Ripon canal and at Westwick should be rejected as misidentifications.

FUNGUS FORAYS IN 1984

Spring Foray, Beverley, 11–14 May

Autumn Foray, Hebden Bridge, 27 September–1 October

T. F. HERING

The Spring Foray was based on Beverley, where an earlier meeting in 1981 had had to be cancelled, using a workroom at the Masonic Hall. Ten people attended, and although conditions were mostly too dry for good collecting, useful additions were made to the species lists for Burton Bushes and other local reserves; however, few of the finds were significant for county records.

By contrast, our Autumn Foray met excellent collecting conditions in what was generally a good season for fungi. Over twenty people met at Hebden Bridge, the site of

much foraying in the past, and used a workroom and accommodation at the Birchcliffe Centre. As well as a number of species new to Yorkshire, there was the county's second record of *Mycena longiseta*, still present at the site of its original British record in 1956.

I am indebted to Dr R. Watling and Dr M. Storey for most of the list below.

List of Sites

Spring: B = Burton Bushes, TA/013397
K = Keldmarsh, TA/034485

Autumn: H = Hardcastle Crags, SD/986292
C = Crimsworth Dene, SD/984294
D = Broadhead Clough, SE/006245
N = North Dean Wood, SE/097213
* = new to Yorkshire

ASCOMYCETES

Nectria sinopica on Holly B
Neobulgaria pura C
Phacidiostroma multivalve on Holly B
Sordaria humana on dog dung N
Tarzetta cupularis H

BASIDIOMYCETES

Heterobasidiomycetes

Calocera pallidospathulata on *Quercus* D

Aphyllophorales

Byssomerulius corium K
Clavaria fumosa D
C. vermicularis C, D
Clavulina cristata D
Coriolus hirsutus D
Cyphellopsis anomala K

Agaricales

Amanita submembranacea C*
Agaricus porphyrocephalus D*
Agrocybe arvalis D
Boletus lanatus H
B. parasiticus D
Clitocybe odora N
Collybia cookei H
Coprinus romagnesianus H, D
C. stercoreus on dog dung N
Cortinarius paleaceus H
C. pseudosalor H, C, D
C. tabularis C
Entoloma ameides D
E. fuscomarginatum C*
E. prunuloides D
E. sericatum D
Gymnopilus hybridus H, C
Galerina calyptrata C
G. vittaeformis C
Hygrocybe flavescens D
H. quietus D, N
Inocybe obscura H
Lactarius serifluus C
Leccinum holopus D
L. variicolor H, D
L. aff. *percandida* C*
Leptonia anatina D
L. catalaunica D
L. corvina D
L. griseocyanea D
L. lazulina D
Lyophyllum connatum H
Mycena longiseta H
M. olivaceomarginata N
Nolanea papillata C
Pholiota alnicola H, C
P. aurivella D
P. myosotis C
Porphyrellus pseudoscaber H
Psathyrella sarcocephala H, C
Psilocybe crobula H
P. inquilina D
Rhodocybe popinalis D
Russula caerulea H
R. cyanoxantha var. *peltereaui* H
R. densifolia H
R. gracillima D*
R. lutea H, D
R. parazurea H
R. vesca C

FUNGI IMPERFECTI

Eleutheromyces subulatus C*

BOTANICAL REPORT FOR 1984

Flowering Plants and Ferns

All the Recorders wish to thank members who have contributed to these reports. The names are given the first time they appear in each vice-county report and thereafter initials are used. The figures indicate 10 km grid references. *new vice-county record.

East Yorkshire (V.C. 61) (F. E. Crackles)

Polystichum aculeatum (L.) Roth Green Lane, Muston 54/07; Y.N.U. Bot. Sect. Excursion.

Ranunculus lingua L. Pond, Hollym 54/32; F. E. Crackles.

Papaver lecoqii Lamotte One plant on disused railway, near Hornsea Bridge 54/24; F.E.C.

Coronopus didymus (L.) Sm. Roadside verge, East Hull 54/13; F.E.C.

Arabidopsis thaliana (L.) Heynh. Disused railway near Hollym 54/32; F.E.C.

Descurainia sophia (L.) Webb ex Prantl Near Pocklington 44/74; Y.N.U. Excursion.

Trifolium striatum L. North of Folkton 54/08; Y.N.U. Bot. Sect. Excursion.

Potentilla anglica Laichard. Skipwith Common 44/63; E. Bray.

Epilobium tetragonum L. ssp. *tetragonum* (*E. adnatum* Griseb.) Near Great Givendale 44/85 and North Driffield 54/05; E. Chicken.

Sium latifolium L. In dyke at Hollym 54/32; F.E.C.

Oenanthe silaifolia Bieb. Water meadow by River Derwent, near Kexby 44/75, 1983; C.Y.

Oenanthe crocata L. Edge of creek between Blacktoft and Faxfleet 44/82; Y.N.U. Bot. Sect. Excursion.

Polygonum mite Schrank Arable weed by recently dredged ditch, just south of North Duffield 44/63, 1983; C.Y.

Salix caprea x *cinerea* = *S.* x *reichardtii* A. Kerner Disused railway line, Harswell 44/84; E.B., conf. R. D. Meikle.

Salix aurita x *repens* = *S.* x *ambigua* Ehrh. Skipwith Common 44/63; E.B., det. R. D. Meikle, confirming an old record.

Calystegia sepium (L.) R.Br. x *C. silvatica* (Kit.) Griseb. Near Full Sutton 44/75, 1983; C.Y.

Mentha aquatica x *arvensis* = *M.* x *verticillata* L. Near Dunnington 44/65, 1983, C.Y. Tilmire 44/64; E.B. Near Broomfleet 44/82; Y.N.U. Bot. Sect. Excursion.

Stachys palustris x *sylvatica* = *S.* x *ambigua* Sm. Near Staxton 54/07, 1983; C.Y.

Galeopsis bifida Boenn. Near Little Kelk 54/16; E.C.

Bidens tripartita L. Near Bubwith Bridge 44/73, 1983; C.Y.

Juncus acutiflorus x *articulatus* = *J.* x *surrejanus* Druce Skipwith Common 44/63; E.B.

Gymnadenia conopsea (L.) R. Br. subsp. *densiflora* (Wahlenb.) Camus & Bergon Filey 54/17, 1983; D. J. Tennant.

Orchis morio L. Stone Pit Slack 44/86; P. Horton.

Dactylorhiza praetermissa (Druce) Soó Brackish marsh by Humber bank, near Easington 54/31; F.E.C.

Carex paniculata L. By Market Weighton Canal, near Broomfleet 44/82; D. Grant.

Vulpia myuros (L.) C. C. Gmel. Disused railway, Hollym 54/32; F.E.C.

Bromus racemosus L. Old pasture, Hollym 54/32; F.E.C.

North-East Yorkshire (V.C. 62) (T. F. Medd)

Cystopteris fragilis (L.) Bernh. Ouse Bridge, York 44/65; Mrs E. Bray.

Dryopteris pseudomas (Wollaston) Holub & Pouzar Sinnington 44/78; T.F.M.

Trollius europaeus L. Marsh, S. of Scackleton 44/67; Dr R. Gulliver.

Ranunculus arvensis L. Castle Levington 45/41; I. C. Lawrence.
R. fluitans Lam. Castle Levington 45/41 and Saltburn 45/62; I.C.L.
Viola canina L. Teesmouth 45/52; I.C.L.
Hypericum elodes L. Waupley Moor 45/71; Mrs H. Pellant per I.C.L.
Euonymus europaeus L. Castle Levington 45/41; I.C.L. Roxby Beck 45/71; R.G.
Ononis spinosa L. Teesside 45/41; I.C.L.
Vicia tetrasperma (L.) Schreb. Hilton 45/41 and Morton 45/51; I.C.L.
Filipendula vulgaris Moench Castle Levington 45/41; I.C.L.
Potentilla anglica Laichard. Hilton 45/41; I.C.L.
Chrysosplenium alternifolium L. Roxby Woods 45/71; R.G.
Epilobium tetragonum L. Coatham 45/52 and New Marske 45/62; I.C.L.
Salix pentandra L. S. of Scackleton 44/67; R.G.
Blackstonia perfoliata (L.) Huds. New Brotton 45/62 and Skinningrove 45/72; I.C.L.
**Orobanche reticulata* Wallr. Near York 44/46; Mrs A. Freer and E.B.
Stachys arvensis (L.) L. New Brotton 45/62; I.C.L.
Lamium hybridum Vill. New Marske and New Brotton 45/62; I.C.L.
Picris echioides L. Skinningrove 45/72; I.C.L.
Ornithogalum umbellatum L. Sinnington 44/78; York & District F.N.S.
Platanthera chlorantha (Custer) Reichb. Saltburn 45/62; I.C.L.
Scirpus sylvaticus L. Marsh, S. of Scackleton 44/67; R.G.
Carex laevigata Sm. Seta Pike, Boltby 44/48; Miss J. E. Dinwiddie.
C. pseudocyperus L. Flaxton 44/66; Mrs M. Hirst.
C. digitata L. Kirkdale; several precise references; Dr M. B. Usher.
Alopecurus myosuroides Huds. Swincarr 44/65; E.B.

South-West Yorkshire (V.C. 63) (D. R. Grant)
Equisetum sylvaticum L. Near Oxenhope 44/03; T. Schofield.
Phyllitis scolopendrium (L.) Newm. Canal Locks, Healey 44/21; E. Lucas.
Asplenium ruta-muraria L. Wall, Thornhill, Dewsbury 44/21; C. Braham.
Dryopteris borreri Newm. Near New Mill, Huddersfield 44/10; T.S.
Ophioglossum vulgatum L. Heath Common, Wakefield 44/31; C. Hartley.
Ranunculus hederaceus L. Near New Mill, Huddersfield 44/10; T.S.
Cardaria draba (L.) Desv. River Calder, Horbury Bridge 44/21; D. R. Grant.
Rorippa sylvestris (L.) Bess. River Aire, Thwaites, Keighley 44/04; T.S.
R. amphibia (L.) Bess. Canal, Altofts, Near Normanton 44/32; D.R.G.
Saponaria officinalis L. M1 Motorway, Ossett 44/22; D.R.G.; on A645 roadside, Pontefract 44/42; E. Thompson; River Calder, Dewsbury 44/22; C.B.
Stellaria neglecta Weihe Newmillerdam, Wakefield 44/31; D.R.G.
Montia sibirica (L.) Howell Near Denby Dale 44/20; T.S.
Genista tinctoria L. Near Denby Dale 44/20 T.S.
Ulex gallii Planch. Near New Mill 44/10; D.R.G.
Trifolium striatum L. Armthorpe, Doncaster; D. Bramley.
Anthyllis vulneraria L. Near Highburton, Huddersfield 44/11; J. Lucas.
Oenanthe crocata L. Canal, Woodlesford 44/32; T.S.
Bryonia dioica Jacq. On A645 roadside near Pontefract 44/42; D.R.G.
Populus canescens (Ait.) Sm. Near Silkstone 44/20; E.T.
P. tremula L. Oxenhope 44/03; T.S.
Salix pentandra L. Fulneck Valley, Pudsey 44/23; D.R.G.
Hyoscyamus niger L. Ravensthorpe, near Dewsbury 44/22; E.T.
Scrophularia umbrosa Dumort. River Aire, Thwaites, Keighley 44/04; T.S.
Pulicaria dysenterica (L.) Bernh. Near Pollington 44/61; D.R.G.
Eupatorium cannabinum L. Whitwood, Castleford 44/32; T.S.
Crepis paludosa (L.) Moench Near Oxenhope 44/03; D.R.G.
Potamogeton epihydrus Raf. Canal, Clifton, Brighouse 44/12; D.R.G.
Dactylorhiza fuchsii (Druce) Soó Near Kirkthorpe, Wakefield 44/32; C.H.

D. praetermissa (Druce) Soó Near Kirkthorpe, Wakefield 44/32; E.T.
Acorus calamus L. Canal, Altofts, Near Normanton 44/32; D.R.G.
Lemna gibba L. River Aire, Leeds 44/33; D. Savage.
Festuca arundinacea Schreb. Whitwood, Castleford 44/42; T.S.
Calamagrostis epigejos (L.) Roth Near Methley River bridge 44/42; T.S.
C. canescens (Weber) Roth Near Kirkthorpe, Wakefield 44/32; D.R.G.

Mid-West Yorkshire (V.C. 64) (L. Magee)

List of plants recorded in 1984 were received from Miss H. Lefèvre, D. Sutcliffe, and D. R. Grant. The list sent by Miss Lefèvre consisted of plants not recorded for the Grassington area in the first edition of the *Atlas of the British Flora*. Very comprehensive lists of both plants found personally during the year and plants recorded on Y.N.U. Excursions were received from D. R. Grant.

Only a small percentage of the records is given in the following list.

Selaginella selaginoides (L.) Link Long Oreston 34/85; D.R.G.
Ophioglossum vulgatum L. Large number of plants, Yarnbury, Grassington 44/06; H.L.
Papaver lecoquii Lamotte Garden weed, Grassington 34/96; H.L.
Lepidium heterophyllum Benth. One plant on old railway area, Threshfield 34/96; H.L.
Acer campestre L. One plant, hedge between Grass Wood and Conistone 34/96; H.L.
Oenanthe fluviatilis (Bab.) Colem. Cock Beck Bridge 44/44; confirmation of 1946 record; D.R.G.
Populus tremula L. Long Preston 34/85; D.R.G.
Salix pentandra L. Clapham Moor, Bowland 34/66; Linton Mires 34/96; D.R.G.
Atropa belladonna L. Stutton 44/44; D.R.G.
Scrophularia umbrosa Dumort. Valley Near Bordley Hall 34/96; D.R.G.
Mimulus luteus L. One plant by Foxup to Cosh; several plants between Foxup and Halton Gill 34/87; H.L.
M. moschatus Dougl. ex Lindl. Harewood Mill 44/34; L.M.
Mentha longifolia (L.) Huds. None-go-byes, Bramhope 44/24; L.M.
Senecio aquaticus Hill Oughtershaw 34/88; D.R.G.
Zannichellia palustris L. Arthington 44/24; Sherburn-in-Elmet 44/44; L.M.
Allium oleraceum L. Becca Banks 44/43; D.R.G.
Iris pseudacorus L. Bank of Wharfe, Grassington 34/96; H.L.
Carex acuta L. Starbotton 34/97; D.R.G.
Hordelymus europaeus (L.) Harz Bramham Park 44/44; C. Hartley per D.R.G.

North-West Yorkshire (V.C. 65) (T. F. Medd)

Equisetum telmateia Ehrh. Hebblethwaite Gill 34/69; Y.N.U. Bot. Sect. Excn.
Hypericum humifusum L. Hebblethwaite Gill 34/69; Y.N.U. Bot. Sect. Excn.
Vicia sylvatica L. Hebblethwaite Gill 34/69; Y.N.U. Bot. Sect. Excn.
Erica cinerea L. Moors above Hebblethwaite Gill 34/79; Y.N.U. Bot. Sect. Excn.
Vaccinium oxycoccos L. Moors above Hebblethwaite Gill 34/79; Y.N.U. Bot. Sect. Excn.
Myosotis secunda A. Murr. Hebblethwaite Gill 34/69; Y.N.U. Bot. Sect. Excn.
Veronica scutellata L. Artengill, Dent 34/78; D. R. Grant.
Hieracium pulmonarioides Vill. Spennithorne 44/18; Mrs E. Moore per D. P Savage det. P. D. Sell.
Eleocharis quinqueflora (F. X. Hartmann) Schwarz Barbondale 34/68; D.R.G. Moors above Hebblethwaite Gill 34/79; Y.N.U. Bot. Sect. Excn.
Festuca altissima All. Hebblethwaite Gill 34/69; Y.N.U. Bot. Sect. Excn.

Casuals and Adventives (E. Chicken)

This year 86 records from 14 recorders involving 72 taxa have been received. Very few records were received with full information and it would be helpful if this could be given

by correspondents whenever possible. Unless stated otherwise it is assumed that a plant has been determined by the finder. The following list is a selection with emphasis on species not reported recently.

Adonis annua L. (63) Near South Anston; R. Smith.
Aquilegia vulgaris L. (63) Waste ground Near Carlton 44/32; 1983 C. Yeates.
Papaver orientale L. (64) South of Scholes 44/33; 1983 C.Y.
Lepidium bonariense L. (63) Shoddy heap, Lofthouse 44/32; 1983 C.Y. conf. T. B. Ryves.
L. ruderale L. (64) Plentiful, Market area, Leeds City 44/23; L.M.
Cochlearia danica L. (62) A19, near Tontine 44/49; Mrs A. Clark.
Lobularia maritima (L.) Desv. (63) Waste ground near Carlton 44/32; 1983 C.Y.
Armoracia rusticana G.M.&S. (63) Toftshaw, East Bierley 44/12; T.S.
Dianthus armeria L. (64) Waste ground, Hunslet 44/33; 1983 D. Savage.
Amaranthus capensis Thell. var. *uncinatus* (63) Field with shoddy, Rothwell 44/32; 1982 C.Y. det. A. Grenfell.
Chenopodium ficifolium Sm. (61) On manure heap, Woodhouse Farm, Flixton Carr 54/08; C. Yeates.
Suaeda vera J. F. Gmel. (62) South Gare, Teesmouth (planted) 45/52; per Mrs M. Burnip.
Lavatera trimestris L. (61) High Street, Hull 54/02; E. Chicken.
Linum bienne Mill. (61) Roadside, Bubwith 44/73; 1983 C.Y.
Linum usitatissimum L. (61) High Street, Hull 54/02; E.C.
Geranium phaeum L. (64) Wayside near Bracken Park, Scarcroft 44/34; 1983 C.Y.
Impatiens parviflora DC. (64) Howgill, Appletreewick 44/06; D.R.G.
Limnanthes douglasii R.Br. (64) Roadside verge of A65 34/95; D. C. Ungley.
Trifolium strictum L. (63) Field with shoddy, Rothwell 44/32; 1982 C.Y.
Trifolium scabrum L. (63) Shoddy heap, Lofthouse 44/32; 1983 C.Y.
Trifolium glomeratum L. (63) Field with shoddy, Rothwell 44/32; 1982 C.Y.
Trifolium resupinatum L. (61) Pulman Street, Hull 54/02; 1983 H. Fowler det. Miss F. E. Crackles.
Trifolium angustifolium L. (63) Field with shoddy, Rothwell 44/32; 1982 C.Y.
Vicia faba L. (63) Waste ground near Carlton 44/32; 1983 C.Y.
Potentilla recta L. (61) Disused airfield, Pocklington 44/74; Mrs J. Duncan Y.N.U. meeting det. F.E.C. (63) waste ground Gildersome Street 44/22; 1983 C.Y.
Tolmiea menziesii (Pursh) Torr. & Gray (63) Grass by canal, Huddersfield 44/11; Mrs J. Lucas.
Ribes alpinum L. (62) Well established in old plantation, Ormesby 45/51; I.C.L.
Angelica archangelica L. (64) Wall side near Otley 44/14; 1983 C.Y.
Euphorbia lathyrus L. (64). Well established, north bank of River Wharfe, Wetherby 44/44; H.D.S.
Ficus carica L. (63) Bank of R Colne 44/11; J. L. Rawfolds Bridge, Cleckheaton 44/12; E. Thompson.
Lysimachia punctata L. (64). Well established on roadsides within 10 miles of Otley 44/14, 44/24, 44/34; L.M.
Nymphoides peltata (S. G. Gmel) Kuntze (62) Pond, Seamer, Stokesley; A.C.
Amsinckia intermedia Fischer & Meyer (61) Scampston 44/87; B. Pashby, the first record for the Vale of Pickering.
Symphytum bulbosum C. Schimper (62) Near Clifton Bridge, York 44/55; C. Westall conf. Dr Nelson.
Pulmonaria officinalis L. (64) Woodland by Parkside Road, Leeds 44/23; 1983 C.Y.
Datura stramonium L. (61) Roadside of A163 near Skipwith 44/63; E.C.
Campanula persicifolia L. (63) Waste ground near Stourton 44/32; 1983 C.Y.
Inula helenium L. (62) Roadside near Overton 44/55; Miss J. Lambert.

Anaphalis margaritacea (L.) Benth. (64) Near Leventhorpe ash lagoon 44/33; 1983 C.Y.
Conyza canadensis (L.) Cronq. (61) Full Sutton 44/75; 1983 C.Y.
Conyza bonariensis (L.) Cronq. (63) Shoddy heap, Lofthouse 44/32; 1983 C.Y.
Anthemis tinctoria L. (63) By canal, Hunslet 44/33; 1983 C.Y.
Centaurea cyanus L. (64) By Roundhay Road, Leeds 44/33; 1983 C.Y.
Cicerbita macrophylla (Willd.) Wallr. (64) Draughton village 44/05; D. R. Grant.
Crepis setosa Haller f. (64) Leeds University precinct 44/23; 1983 C.Y.
Asparagus officinalis L. subsp. *officinalis* (63) Waste ground, Farnley 44/23; 1983 C.Y.
Hyacinthoides hispanica (Miller) Rothm. (63) Gildersome 44/22 and Farnley 44/23; 1983 C.Y.
Briza maxima L. (61) Platform of old Ellerby Station 54/13; F.E.C.
Bromus inermis Leyss. (63) River Calder, Healey, Ossett 44/21; D.R.G.
Bromus willdenowii Kunth (63) Field with shoddy, Rothwell 44/32; 1982 C.Y. conf. E. J. Clement.
Hordeum jubatum L. (63) Canal bank, Woodlesford 44/32; T. Schofield.
Setaria viridis (L.) Beauv. (61) Roadside, Bubwith 44/73; 1983 C.Y.

BOOK REVIEWS

The Moths and Butterflies of Great Britain and Ireland edited by **John Heath** and **A. Maitland Emmet.** Volume 2, Cossidae to Heliodinidae. Pp. 460, with distribution maps and text figures, plus 14 plates (12 in colour). Harley Books, 1985. £45.

This is the fourth of 11 volumes intended to cover all the British macro and micro Lepidoptera. The systematic section is preceded by an article on British Aopsematic Lepidoptera by Miriam Rothschild which is both wide ranging and in-depth. Besides the inclusion of specialized data, many unanswered questions are posed and avenues for future research highlighted. It is fascinating to learn, for instance, that recent research into human memory enhancement via acetylcholine is paralleled in the Lepidoptera by the production of secondary defence chemicals to enhance their primary defences. Biogenic amines (inc. serotonin and acetylcholine) amplify neurotransmission in predators thereby acting as memory boosters and learning aids. There does appear to be some duplication of factual information under the various headings but reinforcement is, perhaps, a useful device in view of the diversity and complexity of the material.

In the systematic section, each species is described in considerable depth. Confusion with similar species is mentioned and their separation considered in detail, eg. *Caloptilia alchimiella/robustella*. The plates include variations of identical species, the Burnets being given special treatment with one colour plate of 64 figures and another of 22 larvae. The *Gracillariidae* have an additional key to the foodplants.

The standard of the plates is quite good. There is some hardness of pattern in the plates of very small species where enlargement to four or five times is necessary. This is not unacceptable to anyone who has examined these tiny wings under magnification — where dots and lines resolve into individual scales and where a superb pattern seen by the naked eye magnifies to a crude scattering of coloured dots. With the larger moths, shading and patterning is easier for the artist and softer on the eye when reproduced. The Burnet plates are particularly outstanding.

The combination of an exhaustive chapter on one particular aspect of lepidopteran biology, together with a full description and life history for each species and good plates, make this series a standard reference for both the beginner and the specialist.

DHS

The Biology of the Muscidae of the World by **Peter Skidmore**. Pp. 550, illustrated. Series Entomologica Vol. 29: W. Junk, Dordrecht. 1985. £76.25.

Here we have a most scholarly book by one of Yorkshire's foremost entomologists. It is a major contribution to our knowledge of the biology of world Muscidae — the family of flies which includes the all-too-familiar house fly.

The bulk of the text comprises a detailed review of the biology and larval/puparial morphology of almost a tenth of the world muscid species. This will prove an invaluable compendium for anyone working on muscid biology or for ecologists whose studies include these flies. The numerous illustrations and comprehensive literature citations will prove particularly valuable.

The introductory chapters concisely present a historical background; exposition of the morphology of eggs, larvae and puparia; a summary of the relationship between morphology and biology in larvae and puparia; a summary review of the light thrown by larval morphology upon the classification of muscid genera; a synopsis of the author's proposed classification; and provisional keys to subfamilies, genera and species for many of the larvae and puparia of the family, along with a summary table for all remaining genera for which there is information. The author's revisions of the previously accepted classification are important, particularly as he has erred on the side of extreme caution.

This book will be a resource for specialists for years to come. It will not only prove indispensable to taxonomists but will certainly be very useful to ecologists as well. Unfortunately the price will mean that most will only be able to obtain it from a library.

RHLD

An Irish Beast Book by **James Fairley**. Pp. xi + 334 including 65 line drawings, maps and figures. Blackstaff Press, Belfast. 1984. £5.95.

This is the second edition of James Fairley's popular book about Irish mammals. Having outlined the species present and the history of the fauna the author then concentrates on selected species, particularly field mouse, pygmy shrew, stoat, fox, otter and the (extinct) wolf. No-one is more able and better experienced to write on Irish mammals than Dr Fairley, whose research on these animals covers more than twenty years. Not only does the account record what is known of these interesting animals, in a relatively impoverished fauna, but it also provides information on methods for their study. The book is well illustrated with line drawings, is inexpensive, and is an invaluable compendium for anyone interested in the natural history of Ireland.

MJD

The Bicentennial of John James Audubon edited by **Alton A. Lindsey**. Pp. xiii + 175. Indiana University Press, Bloomington. 1985. $17.50.

In 1803 the United States of America received from France two phenomenal acquisitions; one was Louisiana, the other John James Audubon. The value of the first was immediately apparent; only now do we recognize the amazing contribution of the latter. This entertaining book provides various authors with the opportunity to examine Audubon's life and work from their own viewpoint; we look upon him in separate chapters as ornithologist, backwoodsman, writer, storyteller, artist and entrepreneur — 'a spectrum of backgrounds and viewpoints to a man whose varied talents and pervasive influence bestrode 200 years of American Life'. This approach has inevitably led to a duplication of some facets of Audubon's life; incidents such as his deception of Constantine Rafinesque, or his investigations of the roosting behaviour of Chimney Swifts appear in different guises. This is not a criticism however; it is interesting to see how the authors have interpreted Audubon's actions differently.

Stanley C. Arthur commented that 'as a man he (Audubon) is far more interesting than aught he accomplished'. Mary Durant, in her essay 'The Man Himself' develops this theme, seeking to delve behind the image Audubon created for himself and which endures

today. Of all the chapters, this to me proved the most entertaining, and sets a high standard for the others to follow; in most cases this has been achieved.

There are many books on Audubon, many more lavish or more scholarly. However, this little book is an admirable introduction to the man, his life and achievements. My only regret is that so little is said about Audubon in Britain, how he went about obtaining subscribers ('It is not the naturalists that I wish to please altogether, I assure thee. It is the wealthy part of the Community. The first can only speak well or ill of me, but the latter will fill my pockets') and how the British reacted to the buckskin-clad, long-haired and magnetic personality that was Audubon.

PSD

Marjorie Blamey's Portraits of Wild Flowers by **Philip** and **Marjorie Blamey**. Pp. 80, copiously illustrated in colour. Collins. 1985. £5.95.

'Marjorie Blamey's Portraits of Wild Flowers' is, by their own definition, a personal selection of those flowers that have particularly appealed to the Blameys during their botanical research for the Collins Field Guides. It is a difficult book to categorize: not botanically comprehensive, yet, with its interesting notes on associated flower legends and their medical and culinary uses, plus a more detailed section devoted to orchids, it is more than a charming collection of flower portraits. Marjorie Blamey's meticulous water colour paintings are delightful, making this a book for pleasant browsing rather than serious reference.

DAC

Perspectives on Plant Population Ecology edited by **Rodolfo Dirzo** and **José Sarukhán**. Pp. xviii + 478, with numerous diagrams. Sinauer Associates Inc., Sunderland, Massachusetts, USA. 1984. £37.50 hardback, £22.50 paperback.

Perspectives on Plant Population Ecology is the outcome of a scientific meeting held in Mexico to commemorate Charles Darwin on the centennial of his death in 1882. It comprises nineteen authoritative chapters by different authors or groups, a valuable list of over 1000 references of which some are in press and the most recent are dated 1983, a Foreword by John L. Harper and an Introduction by the editors. The title represents an area of growing biological comprehension. This area is in Harper's words 'a focus for the links that tie [ecology] to genetics, to evolutionary theory, to conservation and to management'.

The book is divided into four sections: New and Contrasting Approaches to the Study of Plant Populations; The Interface between Ecology and Genetics; Plants as Integrated Ecophysical Units; and Agronomic Implications of Plant Demography. It is clearly and attractively printed. One figure is at odds with the text but not with its caption; if there are more minor errors, they must be few and were undiscovered by this reviewer during several days of compulsive reading. Some key words and phrases not included in the section headings quoted above are: metamerism, dynamic morphology, synecological, biotic interactions, herbivory, breeding systems, intraspecific variation, plant life histories, immigration, environmental signals, weed science. The coverage is thus wide, rather than exhaustive of any one topic; it provides exactly what the title suggests — perspectives.

DJH

The Wildlife of the Thames Counties. Edited by **Richard Fitter**. Pp. 214, with sketch maps, and numerous black and white photographs. Berkshire, Buckinghamshire and Oxfordshire Naturalists' Trust, 1985. £4.95.

The historic counties of Berkshire, Buckinghamshire and Oxfordshire form a compact unit through the middle of which run the upper and middle reaches of the river Thames. For political reasons the internal boundaries have been varied, but fortunately the outer boundary is unchanged and the three counties together form a useful unit for biological recording as well as being the territory of the Berkshire, Buckinghamshire and Oxfordshire Naturalists' Trust, founded in 1959. This book gives an excellent broad

overview of the wildlife of a still largely rural part of southern England. It has been ably edited by Richard Fitter, though since it is the work of many hands it has not the unity and impact of his classic regional study, *London Natural History* (1945). He contributes an interesting introduction on the physical background and the influence of Man, a chapter at the end on problems of conservation, and a very useful appendix in the form of a gazetteer of sites of interest. There are chapters on the history of land use by J. M. Strane, on the vegetation by S. R. J. Woodell, and the flora by H. J. M. Bowen. It is interesting to read a floristic account that includes bryophytes, fungi and lichens as well as vascular plants; room has even been found for a paragraph on algae. J. A. Bateman describes the mammals, reptiles and amphibians, W. D. Campbell the birds and M. E. Varley the fishes. Invertebrates are broadly covered by B. R. Baker, C. O'Toole, and U. Bowen. Since the whole book is little over 200 pages long, and there are many excellent black and white photographs, these authors have not had the space to go into details, but they have succeeded quite well in their aim of presenting a general picture. At the end there is a slightly more detailed study of Bix Bottom, now called the Warburg Reserve. We must echo the gratitude of the Trust to two anonymous private charities whose grants have made it possible to publish the book at a very moderate price.

FHB

Lakeland Fells by **W. A. Poucher**. Pp. 207, with 100 photographs in colour. Constable, 1985. £12.95.

'Lakeland Fells' adds to W. A. Poucher's series of books of photographs of Britain's most beautiful regions. In this companion volume to 'The Lake District' the photographs are as spectacular as ever and are arranged in sequence from Mardale in the east to Wasdale in the west, a route easily followed by visitors travelling by car or on foot. To this end it would have been very helpful to include a map or sketches to indicate the areas described. This book is a visual delight rather than a walker's guide, the text being limited to a few brief sentences describing the location of each scene and indicating any difficulties the walker may encounter. It evokes pleasant memories for lovers of the Lake District; a newcomer, tempted by the sunlit panoramas, should realize that the region sometimes presents a less photogenic aspect.

ARC

Wainwright on the Pennine Way by **A. Wainwright**, with photographs by **Derry Brabbs**. Pp. 216, illustrated. Michael Joseph Limited, 1985. £12.95.

The 270 mile long Pennine Way from Edale in Derbyshire to Kirk Yetholm in the Borders was opened 20 years ago, and it is fitting that this anniversary should be commemorated by the magnificent publication 'Wainwright on the Pennine Way', Alfred Wainwright's narrative description of the walk with his line drawings and sketch maps. The text gives a vivid description of all sections of the walk and places of interest along the Way, in more general terms than in his detailed 'The Pennine Way Companion'. It is beautifully supplemented with Derry Brabbs' photographs which strikingly illustrate the variations in landscape and scenery along the backbone of England. This book will evoke nostalgic memories for those who know the route and stimulate an anticipatory pleasure for those tackling it for the first time.

ARC

The Problems of Evolution by **Mark Ridley**. Pp. 159, illustrated in black and white. Oxford University Press, 1985. £12.50.

This is a worthy, but inevitably perhaps, an unexciting book. The author is concerned with philosophical problems, which for most of us do not have the impact and interest of the problems that we actually come across in our day to day studies, whether we are research workers, field naturalists or just people interested in animals or plants. The examples discussed tend to be of the kind 'Should lungfishes and tetrapods be classified in the same group?' and 'Could artificial (or natural) selection develop legs on a snake?';

admirable no doubt for purposes of exposition, but not intrinsically very interesting. The author poses ten 'problems' for solution. The first: 'Is evolution true?' is no problem, and as he admits cannot in any way be regarded as an open question. In the reviewer's opinion, the same applies to the second: 'The nature of heredity' and also to the matters discussed in the chapters on natural selection. But as the author says 'It is best that our beliefs should be rationally based'; and 'It is well worth knowing the case' for evolution, for natural selection, and so on. The discussion throughout is considered and balanced; the only place where the author is strongly partisan is in the chapter on classification, where he gives more weight to the concept of 'cladistics' than it can reasonably bear. The book should be useful and interesting to undergraduate and immediately post-graduate students who are bombarded from every side by slipshod propaganda for all kinds of fads and fancies, and need readily to be able to arrive at the humdrum facts, clearly and temperately stated.

FHB

The Dictionary of Roses in Colour by **S. Millar Gault** and **Patrick M. Synge**. Pp. xlvi + 191, including 506 full colour plates. Mermaid Books, in collaboration with The Royal Horticultural Society and The Royal National Rose Society, 1985. £8.95 paperback.

Some of the most reasonably priced and beautifully produced paperbacks to have appeared over the last few years are those published in the Michael Joseph's 'Mermaid Books' series. *The Dictionary of Roses in Colour* is no exception: it is lavishly illustrated with first class photographs of roses, old and new, whose colours are truer than those in many more expensive rose books. These are supported by 800 concise but perfectly adequate histories and descriptions. The only drawback is the date of the original hardback edition, as many new and desirable roses have come on the market since 1971. Nonetheless, for those who do not already possess the first edition, this reprint would prove a most acceptable acquisition: those thinking of presents for friends or relatives with an interest in and love of roses need search no further.

VAH

Nest Building and Bird Behavior by **Nicholas E. and Elsie C. Collias**. Pp. 336; illustrated with line drawings and black-and-white photographs. Princeton University Press. 1984. Hardback £44.80, paperback £12.70.

As is fashionable nowadays, this book begins with a discussion of scientific method and the authors' conceptual approach to their subject, but after that they get down to the matter in hand. They offer a classification of birds' nest types, to which is added an appendix consisting of a list of the bird families of the world with an indication of the predominant type of nest adopted (no nest, cavity nest, open nest, domed nest) and additional facts such as the occurrence of brood parasitism and whether the nest (if any) is built by the male, the female or both sexes. A later chapter gives a classification of nest defences against predators, the main categories being concealment, camouflage, inaccessible siting, and taking advantage of other animals by nesting is association with formidable species or indulging in multiple or communal nesting. Within these frameworks the evolution of the nesting habit is discussed exhaustively. There are chapters on adaptations to the physical environment, internal factors in the control of nest building, the effects of parasites in nests, and much else besides. As the authors are authorities on the behaviour of weaver birds naturally we learn a great deal about selection of nesting materials and how nests are built illuminated by first-hand reference to experimental results as well as a whole chapter on the analysis of weaver bird nest building. They do not neglect what might be regarded as side-issues either, and follow up such topics as bower building (structures quite separate and different from nests) in bower birds, in such a way as usefully to illuminate the main theme. There is some justice in the publisher's claim that the book is 'a much-needed synthesis of the previously scattered literature' and it should interest the general naturalist in an apparently mundane subject to which he has probably given little thought.

FHB

CONTRIBUTORS

Archer, M. E., 49–51
Atherden, M. A., 73

Baker, R. A., 141–145
Bartsch, I., 41–48
Bayliss, R. A., 141–145
Błaszak, C., 65–70
Bolton, P. A., 31–36
Bradshaw, M. E., 3–21
Bray, E., 38–39
Brightman, F. H., 52, 110, 123–124, 132, 156–157, 157–158
Butterfield, J., 81–90

Carter, N., 72
Caverhill, D. A., 156
Caverhill, A. R., 157
Chicken, E., 153–154
Cotton, D. E., 140
Coulson, J. C., 81–90
Crackles, F. E., 150
Crossley, R., 74
Currall, J. E. P., 22, 39, 40, 52

Davis, P. S., 155–156
Delany, M. J., 123, 155
Disney, R. H. L., 155
Dixon, J. M., 22
Duncan, J. E., 74–75, 76–77
Dunn, P. J., 91–98

Ely, W. A., 71, 75–76, 146–147

Gilbert, O. L., 124
Grant, D. R., 71, 73, 151–152

Hambler, D. J., 156
Hawkswell, A., 71
Hering, T. F., 37–38, 117–120, 148–149
Hinton, V. A., 158

Lassey, P. A., 91–98
Lawrence, I. C., 74–75
Leslie, R., 23–28
Limbert, M., 103–110, 120
Lister, S. M., 53–64

Magee, L., 152–153
Medd, T. F., 151, 153
Molesworth, B., 74–75

Norris, A., 125–132

Ormerod, S. J., 99–103

Pashby, B. S., 75, 120
Payne, J., 70, 72, 74, 76
Pellant, C., 70–77
Pellant, H. S., 70–77
Pitkin, B. R., 81–90

Richardson, D. T., 72–73

Seaward, M. R. D., 40, 124
Shields, C. G., 70, 71, 72, 73
Shields, D., 72
Skidmore, P., 111–117
Sledge, W. A., 121–122, 147–148
Smith, C. J., 74
Smith, D. H., 154
Spelling, S. M., 133–140
Stonehouse, B., 64

Wallis, A. J., 73–74
Wigginton, M. J., 77–80
Williams, I. C., 31–36

Young, J. O., 29–30, 133–140

INDEX

Acarology
Notes on the Halacaridae of Yorkshire, 41–48; Two new species of mites from the Yorkshire Wolds, 65–70

Biography
The amateur and professional scientist: a comment on Louis C. Miall (1842–1921), 141–145

Book Reviews
22, 30, 39–40, 52, 64, 110, 121–122, 123–124, 132, 140, 154–158

Botany
Studies on the flora of Teesdale, 3–21; Hybrid willows, 38–39; Pondweed records, 147–148; Botanical report for 1984, 150–154

Bryophyta
The bryophyte flora of West Lancashire: additions and deletions, 77–80

Diptera
The distribution and biology of Sphaeroceridae in upland regions of northern England, 81–90; Diptera report: 1977–84, 111–117; New craneflies for Yorkshire, 146–147

History of Natural History
Naturalists on Hatfield Moor, 103–110; Collectors and collections, 125–132; The amateur and professional scientist: a comment on Louis C. Miall (1842–1921), 141–145

Hymenoptera
The wasps and bees of Pompocali, near Leeds: the first 27 years, 49–51; *Coelichneumon bilineatus* and *C. consimilis* in Yorkshire, 146

Mycology
Autumn fungus foray, 1982, 37; Spring fungus foray, 1983, 37–38; 100th autumn fungus foray, 1983, 117–120; A fervour for fungi, 121–122; Fungus forays in 1984, 148–149

Ornithology
The population and distribution of nightjars on the North York Moors, 23–28; Wildfowl movements in Yorkshire and Lincolnshire and elsewhere along the east coast of Britain, 1982, 53–64; Little gulls in Yorkshire, 91–98; Optimal foraging by breeding dippers on a Lancashire hill-stream, 99–103; Hornsea Mere decoy, 120

Parasitology
The helminth parasites of the European eel from the Driffield Canal, 31–36; Parasites of British, lake-dwelling leeches, 133–140

Turbellaria
Freshwater microturbellaria from the English Lake District, including three species new to Britain, 29–30

Yorkshire Naturalists' Union
YNU excursions in 1984, 70–77

YORKSHIRE MAMMALS

edited by
M. J. Delany

A comprehensive review of the natural history, distribution and recognition of mammals within the county of Yorkshire (at its pre-1974 boundary) written by a group of expert naturalists. A definitive and authoritative work.

256 pp, 70 line drawings and maps, £3.95 plus 55p postage and packing. Available from School of Environmental Science, The University, Bradford, BD7 1DP.

Printed by the Leeds University Printing Service ISSN 0028-0771

SMITHSONIAN INSTITUTION LIBRARIES
3 9088 01206 3574